

16-Bit Video

FROM THE TEST CENTER



VOLUME 11, ISSUE 1, \$2,95



## DEC, HP/Microsoft Lead In OSF Interface Search

Preliminary Specs to Be Unveiled January 11

#### BY MARTIN MARSHALL

The Open Software Foundation is poised to announce this week its much-awaited graphical user interface, with contributions from DEC and Hewlett-Pack-ard/Microsoft the favorites. The preliminary announce ent to OSF members will be followed on January 11 by a full disclosure of the specification for the interface, which OSF

The final determination of the UEC is subject to some lastminute wrangling over licensing terms and other business conditions. According to OSF director of development John Paul, as of last week, "The OSF technical team has boiled it down to a short list of alternatives, arranged in their order of prefer-See OSF, Paga 105

Component (UEC).

oow calls a User Environment

## IBM Faces a Critical Year With OS/2, PM, and PS/2

#### BY ALICE LAPLANTE

The year 1989 will be critical for IBM. In addition to OS/2 and Presentation Manager applicaons finally becoming available, io 1989 IBM's PS/2 strategy will be judged as either a success or a With EISA machines due out early as the third quarter, IBM has nine months to send

the corporate world with machines cootaioing its controver sial Micro Channel Architecture (MCA). And oow that applications exploiting the capabilities of the MCA are finally being demonstrated, IBM must continue working hard to get the word out. (See "Products Bene-fit from MCA's Power," November 21, 1988, Page 8.) See IBM, Paga 106

#### Bugs Uncovered in Dbase IV's SQL Ashton-Tate Admits Internal Errors That Cause Inaccurate Results

Dhase IV's SOL mode coo internal errors and sometimes roduces ioaccurate results,

work-arounds, which will be times and updet in Content updet from transact where an

> This internal error in Doase IV SQL may occur when the physical order of records in a data file is very similar to the order of its index

pany representatives said. In one instance, a produces 36 records under IBM andard SQL tests, but Dbase mizing and translating SQL quesearch condition. If users do not IV returns an answer of 12 records. In four other known ries and subqueries into Dbase write extensive test programs to verify results, they may mistake

commands, a process that takes place inside Dhase IV and is transpareot to users, said various SQL experts. According to tests produced by Quadbase Systems of Sunnyvale, California, in one instance Dhase IV failed to retrieve all the data that matched an SQL

the errors for complete, accurate answers, said Fred Luk, Quadbase's president. Quadbase sells Dquery, an SQL query interfact for Dbase and 1-2-3 data files. All the queries in Quadbase's evaluations use IBM DB2 stan-

# Windows 3.0 to Manage Memory Better

#### BY ED SCANNELL

Ashtoo-Tate has admitted. Ashton-Tate is develo

available to users this month and plans to fix the problem entirely io future versi

instances, Dhese IV is unable to

process the query, returning an

other query produced no result, and Dbase IV gives inconsistent

results in yet another test.

The problems may

from the complexities of opti

"internal error" message. An-

Microsoft Corp. plans to release oext fall a major upgrade to Wiodows that will have a dramatically improved memory management scheme and an interface more like that of Pre-IN THIS ISSUE

Wiodows 3.0's improved emory management will use RAM above the 640K barrier

memory below 640K."

more efficiently, according to sources briefed by Microsoft. The current version, Win dows 2.1, "uses extended mem ory oow, but there are too many cases where they bave to use memory below the 640K line to do things," a source said. "For example, when you load a device driver, you can only use

drivers in extended memory, said another source. "They're working on memory management and speed. The oew release will take advantage of the 80386 chip, sources said. Microsoft also plans to enhance the memory

management scheme of Windows versions that work with the 80286 processor, they said. Microsoft officials refused to comment on its future plans for See Windows, Page 105

AT DEADLINE

## Firms Plan Low-Cost **Optical Floppy Disk**

been licensed by Tandy, Philips, and Du Poet Optical, announced an agreement with a Japanese firm to develop an inexpensive optical

Teijin Ltd. of Japan, a \$4 billioo synthetic materials manufactur-cr, has licensed ODI's patented dye polymer coating for use in mid-1990. Donald Mattson, president and CEO of ODI, said that his firm hopes to offer 500 megabytes on a 5%-inch flexible disk for the

me price as a floppy disk Teijin will manufacture the disks and is now talking to drive nufacturers about building drives that can use the new m

- Stuart J. Johnston wed on Paga 3

#### REVIEWS: Top 100 Harriware





Computing in the Year 2000

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use Foxfrainh, the existing new graphics package from Fox. Take a look at Exi8ASE+ today, You won't find a more powerful dBASE-compatible relational database management system. FoxfaASE+ is retails for \$395 FoxfaSE+/AN Fox \$595 and Foxfrainh for \$295 at your local quality software dealer Or call 419/8/84-Of62 for more information and a free demo-package. Ask for extension 540.

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face stiff price competition....

was not in 1988 .....

large collections of files.

computing in 1989 .....

project .....

NETWORKING 

SOFTWARE

Leading PC suppliers expect to do well in 1989,

although analysts fear second-tier vendors may

PC managers evaluate what was hot and what

Users and resellers think Lotus' soon-to-be-

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Apple will continue its push into mainstream

Macintosh users put lower prices, more DRAM

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Traveling Software will release a new class of

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Businessland cofounder Enzo Torresi resigns his post to become president and CEO of a network server company.

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#### Pacific Data Products' ROM cartridge will let PRODUCT COMPARISON Laserjet printers emulate an HP pen plotter ..... 6

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CONTROL ADDRESSION, AND PURSES 6 PRIVACES 1000 Along hims, State 7 COS, Nevel Park, CA COSCO, CALL \$1.25 - ALONg Park, Park 170(27) 5 Privacy March March, Companior Parcel 1, 1877. The Security COSCO, March March 2014-127. POREAL MODBANTAIN: Second-costs possing pairs of More Park, CA COSCO, March 2014-127. POREAL MODBANTAIN: Second-costs possing pairs of More Park, CA COSCO, March March 2014-127. POREAL MODBANTAIN: Second-costs possing pairs of More Park, CA March Robert 2014-127. POREAL MODBANTAIN: Second-cost pairs of More Park, Park

#### AT DEADLINE Continued From Page 1

#### Lotus Look-and-Feel Suit Delayed

Lotus' look-and-feel suits against Paperback Software and Mosaie stalled when a judge granted the defendants' request for a threemonth extension to the discovery period. Paperback and Mosaie have until February 28, 1989, to familiarize their new lawyers with the cases as well as take depositions from more Lotus employees, according to Adam Osborne, president of Paperback Software. Osborne plans to depose programmers working on 1-2-3, Release 3.0 to show that Lotus has included features from VP-Planner in the upcoming release The judge on the case will set a trial date after the depositions are

completed, said Lotus' attorney Hank Gutman. Lotus believes the case may come to trial by late 1989. (See related story, Page 6.) - Rachel Parker

#### Micropro Reports \$2.6 Million Loss

After a management turnover and severe layoffs in November, Micropro announced it lost \$2.6 million for the quarter ended November 30. The company's sales for the quarter totaled \$9.7 million, down from the \$10.3 million reported for the same quarter a year ago. The loss was attributed to both disappointing sales and the costs associated with the recent layoffs, although Micropro's new president Gari Grimm said the cost reductions should help the company return to profitability. - Rochel Parker

#### TI. Hitachi Join to Develop Chips

- Panda S Stone

Texas Instruments and Hitachi announced a joint development agreement to produce 16-megabit DRAM chips. Each company will offer its unique technology expertise and provide access to each other's 16-megabit development technology. The companies will compete in manufacturing and marketing the chips, according to a TI

#### Leading Edge Ships \$2,995 386 PC Leading Edge is shipping its Leading Edge Model D3, a \$2,995 386-

based desktop PC with I megabyte of RAM that runs at 8 or 16 MHz. It comes standard with a 1.2-megabyte diskette drive, monochrome monitor, 101-key keyboard, GW Basie, and MS-DOS. For a limited time, customers can redeem newspaper coupons or a videotape describing the product at Lending Edge dealers to receive a 65-megabyte superspeed hard drive free with the purchase of any new D3 machine, the firm said. Leading Edge also offers a 2-meg version of the Model D3 with the same options plus OS/2 for \$3,995.

#### RIX Ships Limited Scanrix Software

Software allowing scanned color images to be viewed and edited without a secondary color monitor or a proprietary graphics board is now being shipped by RIX Softworks Inc. Scannix allows color images to be scanned by the Sharp JX-450 or Sharp JX-300 scanners at resolutions up to 300 dots per ineh. Scanned images can be stored in Colorix file format or as a Targa-compatible file

The Scanrix-Targa format is the same as that produced by Truevision Corp.'s Targa board, which is designed to accept video or scanned images and digitize them to yield enhanced images of near-

video quality. However, Scannix allows images to be scanned and edited without requiring the Targa board or an additional monitor. Scannix is now shipping in limited numbers, with volume shipments planned for early next year. It has a list price of \$699.

— Mark Brownstein

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### **NEWS**

## Top Vendors Optimistic About the Coming Year

BY RACHEL PARKER Polishing their crystal balls, the leading PC suppliers expect to do well in 1989, but analysts are concerned that second-tier ver dors may run into trouble as

they compete fiercely on price. Speaking at a recent financial conference, representatives from Apple, Compaq, and Sun said that they are optimistic about the coming year. Officials believe the industry overall should experience about 15 percent to 20 percent unit and revenue growth, with the high end providing the fastest growth and the best margins.

"We see contin the high end," said Rod Canion, president and CEO of Compa There is a new segment of buyers — those who would have bought the fastest 286 - who



pany to get components faster.

are buying the 386SX." Canion also discounted as imptions that troubles at component manufacturers - such as Advanced Micro Devices, Intel, and Seagate - are early indicators of slowing demand in

the PC market. More likely. many PC manufacturers dos or triple-ordered during chip shortages, and are now trying to use their excess inventory, Canion said. "Demand is not a problem for us this quarter," be said. "Our problem is that of product availability Similar component and

manufacturing constraints are the limiting factors at Apple. "We cannot keep up with demand," said John Sculley, president and CEO of Apple, who added that the company would have to keep the factories working through Christmas.

The vendors also dismissed scerns about a recession, saying that they don't believe cornorations would stop buying their products, even if the economy slows down

A recession might even have positive results for some compa-nies. "A recession would be nice nies. "A recession would be nice because we would get compo-nents faster," said Scott McNealy, president and CEO of Sun Microsystems. "That means we could get product out factor and our margins would

while agreeing that the top tier of suppliers will likely enjoy Compag's Rod Canion sees a

new segment of buyers turning to 386SX machines

a strong 1989, analysts are concerned about PC vendors that have not differentiated their product lines or distribution strategies. Already, companies like AST and Wyse are feeling price pressure from IBM's Model 30 286, analysts said. We are already seeing a

bloodbath among the clones said Peter Rogers, a PC analyst with Robertson, Colman & Stephens, in San Francisco. And Rogers believes these companies will be left out of the high-end market. "The gap between the leaders and the losers is widening, primarily because of 32-bit machines," be "The 386 won't be a dity like the 286 is because of its pricing and the types

of applications it can handle In addition, the distribution channel is becoming increasingly competitive, and brand names are more valuable to dealers, said Doug Van Dorsen, a PC analyst with Shearson, Lehman, Hutton, in San Rafael, "The top end - Apple, IBM.

and Compaq - have dollars for

the dealer channel and brand recognition." said Van Dorsen.

EWHAT'S HOT, WHAT'S NOT

### **Users Not Inspired by Latest Technologies**

hat was bot and was not in 1988? Each year InfoWorld asks its readers this question, but this year the results

In 1988, Steve Jobs took the wraps off his futuristic Next machine: two versions of a nexteration operating system -OS/2 and Extended Edition were delivered; a new graphical user interface that will have an impact on virtually all com platforms - Presentation Man-- was shipped to custom ers, and over 10 new industry standards - most in direct conflict with other so-called standards - were proposed.

So, what did PC managers say were the hottest items of 1988? DOS. Windows applica tions. 386 machines. Local area networks. And multitasking under Desqview. In other words, none of the "next-generation products that have made the adlines all year long. Brian Livingston, a cor ectivity specialist for Gen-

eral Electric Consulting, in New York, and chairman of the userorganized 486 Standards Comttee, nominated DOS extenders, which allow users to access more than 640K in DOS, "They are not sexy," Livingston said "They simply work." Bob Quick, a microcompute

manager at Northern Life Insurance, in Seattle, also named ng technology as the most significant. In his case, he is installing Desqview on 386 PCs to provide multitasking without baving to movimg up to a more expensive and complicated

A recent study by the Sierra Group backs this trend up. When MIS directors were asked about their 1989 purchasing plans, they downplayed the im portance of newer products and technologies such as OS/2, RISC, and Unix in comparison to their 1988 purchasing plans surveyed a year ago

items from 1 to 10 - with 10 being most important - DOS ed the highest rating of 6.8, followed by PC integration at 5.8. (In the 1988 survey, the Sierra Group did not ask MIS directors to rank DOS, so direct comparisons between the years

may not be valid.) Unix actually declined in nportance from last year, from 3.7 for 1988 to 2.5 in 1989. But it was OS/2 that experi nced the worst downslide: The extended Edition of OS/2 declined from 4.6 in 1988 to 3.8 in

1989, and Standard Edition declined from 4.7 to 3.3. ne surveys were sent to 32,000 MIS directors at Fortune 1000 and medium- and smallsize companies. "These priorities underscore that the market is now intent on interconnect its current PC solutions and is less intent on making a technology transfer to newer PC environments," said Marty Gruhn,

vice president of the Tempe, Arizona-based Sterra Group. There are two reasons customers avoid the new technology, Gruhn said. First, there is the bigh cost of implementing it, which involves the cost of mem ory as well as the fact that capital has already been invested in older, and perhaps incompatible, products.

Second, there is the perce tion in the customer base that the new technology doesn't necessarily offer any added value. Gruhn said. PC managers interviewed by InfoWorld agreed. For example, if Lotus comes

out with a version of 1-2-3 that uses a DOS extender, it will make a lot of people wonder wby they should pay the high cost of more complicated technology when they can do larger applications as well as multitasking under DOS the way it is," said General Electric Consulting's Livingston. Still, Gruhn said her research

shows no slowdown in purchasing, just that purchases will be of less-than-innovative products.

#### Lotus' Magellan Will Be Aid to Power Users place, they're good. But setting with many popular non-Lots them up is so much work that

Users and resellers believe Lotus

Development Corp.'s soon-tobe-released Magellan program eases the difficulty power users have in managing large colle tions of files, but say novices will have to acquire a taste for it. Sources say Magellan, sched-

uled to be announced this month and shipped in the first arter, is a \$139 DOS shell/hard disk organizer that lets users more easily retrieve information and better organize dozens of cryptically named DOS "As someone who supports

PC users, 'simplifier' programs like this sometimes make things more complicated for unsophis-ticated users," said Phillip Gordon, office automation manager for Charles Schwab & Co. "Things like DOS shells and hard disk managment tools have things they won't or don't use or might use incorrectly "When they [DOS shells/-hard disk managers] are in from a corporate point of view there is little payback," said Leslie Fiering, assistant vice president of Bankers Trust, in New York. Resellers and consultants who have seen Magellan said both novice and experienced users will bave little diffi culty adapting to it. Two such sources said Magellan contains many useful file-handling features that aren't, but should be, in DOS "It's major-league powerful,

and I think it will make the PC a useful tool," said one reseller who recently saw the program. It really is a little bit of magic

One of the nice things it lets you do is open a file to peck in and see what's there," said a consultant, "You can't edit what you see, but it lets you browse through spreadsbeets that you ordinarily would have to load one hy one to take a look at. It will save people a lot of time."

Masellan is efficient at inde ine hard disks and can work applications, one source said. sers can quickly view a group of files and examine them singly Megallan also lets users collect files and move them into an application, sources said. The

man Marty Taucher.

program has a tree structure ectory, a macro language, and point-and-shoot DOS com mand as part of the shell Lotus refused to comment on details of the product

Word 4.0 for the Mac's Ship Date Delayed a Second Time REDMOND, WA - In its We want to make sure we second shipping delay since berelease it without bugs,

ing aonounced last June, Taucher said. dicrosoft Word 4.0 for the The latest testing cycle is Macintosh will not be released scheduled to end in late January, until at least late February, a said Taucher, However, the accompany official said recently. The latest delay is due to a tual date the program will be on dealer shelves depends on bow longer-than-expected testing cy-cle and ongoing efforts to optismoothly the upgrade process goes, he added mize speed and memory handling said Microsoft spokes-

At the program's announcement, Microsoft said it planned to release the long-awaited up-

date in October 1988. Later, the company said it would have to delay the program until just before the end of 1988.

Among the program's major new features are support for creating tables and Page View, which permits the user to edit working in columns Word 4.0 will also let users more easily position graphics and set additional preferences. - Laurie Flynn

# Mosaic Plans to Offer 3-D Spreadsheet, Countersues Lotus

#### ED SCANNEL

Mosaic Software Inc. will unveil next month a three-dimensional spreadsheet intended to compete with Lotus' unre-

internoce to compete with Lotus unreleased 1-23, Release 3.0.

In a related development, Mosaic recently filed a countersuit in U.S. District Court against Lotus, accusing the company of hurting 1-2-3 clone makers by not shipping 1-2-3, Release 3.0 within a reasonable time of its originally announced shipping date. Mosaic's updated product, called Twin Legend, handles both minimal and background recalculation, which no other spreadsheet now available has, said Richard Berlins, Mosaic's president

spreadsheet now a validable has, said Nichard Bezjina, Mosaic's president.
"It will be the only spreadsheet on the market that has both in the same product, which we think will make it the fact, which we think will make it the fact, product on the market when it's in recalc

mode," Bezjian said.

Twin Legend contains a set of userdefined functions called Easy Function, which lets users build routines for various features such as formulae. It can automatically save worksheets and make buck-up files, similar to a program called SOS, or Save Our Spreadsheet, from Gold Data Services Inc., Bezjian said. Like Microsoft Corp,'s Excel, Twin Legend can also

Corp. 8 Excet, 1 win Legend can also consolidate files, he said mosaic's legal challenge claims Lotus has unjustly forced customers to freeze purchasing decisions of non-Lotus products while they wait for 1-2-3, Release 3.0 to be released. "We are suing them for plaving sames with the market." Bezifan

said. "If you can't ship a product within a reasonable amount of time, then you should not announce that product." Lotus has twice delayed Release 30, saying it underestimated the enormity of the task. The program is now scheduled to ship by the end of the second ounter.

to sup by the end of the second quarter, more than a year behind schedule.

Lotus sued Mosaic and Paperback Solvane Inc. two years ago, saying they illegally copied features of Lotus 1-2-3.

Bezjian said a pretrial hearing for that suit is scheduled late this month. However, he said he does not expect the suit to go to

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#### New ROM Cartridge Lets Series II Printers Emulate Pen Plotter

#### By Son Powring

trial for several sounths.

Pacific Data Products plans to release in late January a ROM cartridge that lets Lastrjet Series II printers emulate a Hewlett-Packard pen plotter, and a Post-

script-emulation curridge in the spring.
Both products plug into a fostcartridge receptacle on the Luserjet,
providing a quick and inexpensive way to
customize the printer's capabilities for
different applications, said John
Downing, Pacific Data Products presiprinter emulation on a font cartridge for
the Series II, he said.
The product, called Plotter in a

Carridge, emission the Herolet-Packard "A745 potters and will cost \$355. Whit the carridge installed, a Laserje can be used as a high-people profing device to the cost of the cost of the cost the time necessary on a pare plotter, Downing said. The emission support the full Herolet-Packard Craphics Language (HPCA), including variable para garage (HPCA), including variable para generation, fill and shading patterns, is and y axis scaling, plot roution, and automatic plot staring for letter and legal size paper and transparancies. In define size paper and transparancies from prints Language and prints Language the proper forces from the said of the prints Language and prints Language prints prints

The emulation provides plot spooling, flow control, and other networking features and requires the printer to be configured with a full megabyte of page memory.

ROM cartridge emulation is possible because the Laserjet controller checks cartridges as they are inserted to determine whether those cartridges contain controller code or font information, Downing explained. If they contain code, the controller executes it, he said.

Sources close to the company say it is applying the same technology to develop Postscript emulation on a cartridge for the Laserjet, which will be available next spring. The company, which is still developing the product, hopes to achieve performance comparable to the Laserwiter II NT with a retail price under \$600 the sources said.

The product will likely come in versions with 13 and 35 Laserwritercompatible resident outline foots and work with Bitstream downloadable char-

work with Bitstream downloadable character outlines.
Pacific Data Products, 6405 Nancy Ridge Drive, San Dingo, CA 92121; (619)

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# Why wait until dBASE IV can talk to SQL Server?

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#### Apple to Push Into New Environments

## Plans for '89 Emphasize Connectivity Instead of New Technologies

Apple Computer Inc.'s product ns for 1989 are expected to further the company's steady ing environments rather than lutionize technology.

Despite Apple's rhetoric on such subjects as knowledge navieation and Hollywood-quality graphics, statements by Apple officials and reports from sources close to the company indicate Apple bopes to bold the attention of its large corporate customers pext year with more mundane products such as connections to DEC minicomputers and IBM mainframe databases systems integration, increased CPU power, and, finally, a

And, given the recent arrival on the market of IBM's Presentation Manager and the imminence of the Next computing system, 1989 will test Apple's capability to innovate and maintain its perceived edge in the graphical user interface and ease

Traveling Software will intro-

duce this month a new class of

software that provides logical

links between programs, files,

and their data, simplifying tasks for users who work in multiple

programs.
The product, code-name

Papillon, can quickly find infor-

mation in files using several

types of search criteria and can

link files by work task, said

sources close to the Bothell, Washington-based developer.

In the way of CPUs, Apple chairman John Sculley said recently that the company will introduce io 1989 several new Macs based on the top-of-the line 68030. The first of these will be a one-slot system similar to the current SE but with an

incompatible slot, according to sources close to the project. Apple will follow that an-nouncement within a few months with a pared down Mac II, equipped with only three slots instead of the standard six Sculley also said the upcoming 68030-based Macs will include Apple's new high-density Superdrive, capable of reading DOS

Sculley has also said to expect a Macintosh laptop this year, although perhaps not in great enough quantity to mect the expected high demand. That project has been delayed reneatedly because of low yield in screen technology and a poor track record io battery life, according to Apple.

Traveling Software Plans Search Program

directory structure," said a

source who has seen the pro-

gram, "It also provides intelli-

find every article that's been written about X," said Tim

Bajarin, exceutive vice president

of Creative Strategies Research

International, in San Jose, Cali-

fornia, who has seen the pro-

formation Network, and West-

ern Union were the involved E-

The initial AIA clients will be

eing Co., Northrop Corp.

General Dynamics Corp., and

Hughes Aircraft Co. Four more

AIA members, yet to be named, will add the X.400 capability

after completion of the initial

Mail providers

nce in handling the way those files connect."

"For example, I might like to

In communications, most prominent of the upo product introductions is the promised Token Ring and 3270 emulation cards for the Mac And 1989 will be the year users receive the first concrete benefits of Apple's technology-exchange relationship with Digital Equipment Corp., starting late in the year with DEC's introduction of an Appleshare-compatible file server for the VAX.

Strategic products are also expected as a result of Apple's 1987 acquisition of Orion S tem nublisher of IBM SNA products, and Network Innovations, which developed the CL/I communications language for Macintosh-to-mainframe con-

Also in Apple's labs is at least one new monitor - a highresolution, 20-inch mor chrome system - and an 8-bit video card, according to sources close to Apple, who said they expect the commany to introduce those products early in the

# WISH LIST 1. Apple Lepton 2. Color Standards 4. Network 5. Lower Mac

### **Corporate Customers** Make Mac Wish Lists

Cite Lower Prices, More DRAMs, Laptop Mac Armand is also eager for a

proved availability of memory upgrades, and a laptop Macintosh top corporate customers' wish lists for Apple and Macintosh developers in the coming

Network management software, improved development tools, and more seamless connectivity are also much on the minds of volume Mac buyers. While lower Mac prices are ong the top items on the wish list of Vernon Keenan, microcomputer manager at Genen-tech, also included are color

output devices, better protection from viruses, improved support of corporate developers standards in the world of 32-bit Fred Armand, who's in

charge of overseas computing at the Peace Corps' headquarters, in Washington, cites increased availability of DRAMs as his top wish for this year. Armand said he has been waiting almost a year for 5-megabyte upgrades for the organization's Macs.

Mac laptop, which given the international scope of the Peace Lower computer prices, im-Corps isn't surprising. wouldn't mind the SE having a bigger screen," he added. Cheis Vcal, a partner at

Arthur Young & Co. in charge of technology in the San Jose. California, office, is hoping 1989 brings more transparent networking, particularly for electronic mail, "I'm waiting for mail that will run across environments of PCs and Macs and maybe Unix," be said, "What really frustrates me is not being able to do elegant, seamless communications between environments. What we really need is application-level stuff to take advantage of this." A micromanager at a large shipping company opined that Apple

needs better connectivity to ? view as well as improved CASE Steve Miner, a software engi neer at SRI International, in Menlo Park, California, echoed Veal's call for better E-Mail and added that, "Apple needs to clean up user interface details."

#### E-Mail Providers, AIA Members Start Pilot X.400 Interconnection Project

#### Dy less Augus

Eight members of the Aero stries Association (AIA) and eight major E-Mail providers agreed over a long conference call last week to launch a pilot X.400 interconnection

The X.400 standard, Version was agreed to in December 1987, and it provides for inter-E-Mail system connections, permitting users on any X.400compatible electronic mail system to communicate with users on any other X.400-com-

patible system. The AIA project will start in early 1989, according to Steve Haracznak, General Electric Information Services' spokesman He said his company and AT&T. MCI, Telenet, McDonnell-Douglas, Dialcom, IBM In-

Haracznak said some of the providers already have X.400 compatibility, which should accelerate the success of the pilot He also said the AIA was a good choice for the pilot project because members constantly needed to communicate with their suppliers and bidding part-ners. Because those people that members needed to contact are also AIA members, the project makes good sense, Haracznak

#### "It [Papillon] provides the capability to use a 'the way you "On the left, it would gram. "On the left, it would have a keyword tree, and the work' structure on all your files without regard to the DOS right side would show the exact files it's in. When you cursor over to the file, you can open it." "It's not exactly a shell, but it

serves those functions, and it's not a working environment like Windows, but it serves those functions too," said one source. The product will be rolled out on January 25 at a general meeting of the Boston Comput-

er Society, according to several Those who have seen the program agreed that it fits no urrent class of software.

'There's nothing like it out there." Bajarin said

## Software Puts X Window on the Mac

#### Program Creates Bit-Mapped Window to Display X11 Graphics, Text BY MARTIN MARSHALL

Sam Solon, White Pine presi-

AMHERST, NH - White Pine Software Inc. recently announced a \$499 software package that turns any Macintosh

into an X Window terminal. works under Multifinder to creste a his manned window on

screen capable of displaying X11-based graphics and text The remainder of the screen will be available to display other Mac tasks running concurrently. X11 is a network-transparent windowing system developed by

MIT and supported by a large number of Unix-oriented sys-tems. The use of the X Window system will allow Mac systems The amount of graphics detail seen on-screen in X Window to display bit-mapped graphics depends on how much RAM is that are created by remote, non-Mac network nodes, as long as dedicated to supporting the win-

dow, said Terrell Mitchell, vice those nodes are using the X president of engineering. Exodus also provides an X The Exodus package sup-Window system front end to ports all Macintosh computers client applications running on a with at least 1 megabyte of RAM, including the Mac Plus, diverse collection of host systems on the network. The Mac SE and II. The initial release OS interface controls Exodus. will support Appletalk, Decnet,

which provides X Window serand TCP/IP communications. Version 1.0 will be shipped in vices within the familiar Mac "Users will be able to view the X Window as just another

the first quarter, the company White Pines Software Inc., 94

Route 101A, Box 1108, Amherst, NH 03031; (603) 886-



# WordPerfect Office gives your network the power of positive linking.

Your PC network can greatly improve group productivity and organization – if you give it the power to do so.

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WordPerfect Office also integrates application software on a flexible "shell" menu, giving you one-keystroke access to any program, and letting you exchange data between compatible programs in a matter of seconds. And WordPerfect Office features a Notebook program that makes it easy to create, organize and call up frequentlyused data records. Office also provides network users with a calendar, file manager, macro editor, program editor and calculator.

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# NETWORKING

# Core Ships ESDI Disk Controller for MCA Bus

CNT-MCA Supports Novell SFT Netware

#### BY ROBERT SNOWDON JONES

Core International is now shipping its Enhanced Small Device terface (ESDI) disk controller for the PS/2 Micro Channel Architecture (MCA) bus that supports the Novell Networe 2 by fault-tolerant disk backun

The Core CNT-MCA controller supports up to two drives per controller. It is an MCA bus master, which gives it the power to support Novell Netware System Fault-Tolerant (SFT) software and Transactional Tracking System, said Core spokesman John D. Simonds Jr.

By using two CNT-MCA controllers and disk drives on one server system, the Novell SFT will make mirror-image backups on the second disk through a process known as disk duplexing, Simonds said. The capability of running SFT has only been available on AT-bus ms until the release of the

CNT-MCA, be added. "A true fault-tolerant environment has backup for power supply, controllers, and disk drives," Simonds said. "Duplexing disk drives has been impossi-ble on Micro Channel machines up to this point because more than one ESDI controller hasn't



been able to coexist on the MCA bus." Simonds said. Until the advent of the CNT-MCA, file servers based on IBM's PS/2 Models 60, 70, and 80 have been unable to take full advantage of the fault-tolerant features available in Novell's

\$4,695 SFT Netware 2.1x, The CNT-MCA has an onboard direct memory access controller that permits transfer rates of more than 900K per second when connected to 10-MHz ESDI drives.

Simonds said the CNT-MCA is also useful for owners of the PS/2 Model 60 who want to expand disk capacity and gain

terminals and a printer accord-

ing to Emulex product manager

Kevin Drum In addition the

boards can support multiple protocols. In addition, a port

termination box can be used to

provide parallel and serial con-

memory interface and sizable memory windows. It also allows

modification.

The board supports a shared

Coprocessor to Let Dumb

Terminals Access Nets

# Users Choose 'Classic' Crosstalk XVI Over Mk.4

Just as Coca Cola Co. learned

when it experimented with New Coke Crosstell Communications has discovered that its "classic" Crosstalk XVI software is still more popular than the company's newest telecommunications software

Crosstalk Communications said last week that it has begun shipping Version 3.7 of Crosstalk XVI, and it is firmly committed to continued development and support of the software. The upgrade, announced at fall Comdex, gives the communications software the capability to operate in the

Crosstalk's more recent Crosstalk Mk.4 hasn't gained as wide accentance, even though it has a new user interface and is filled with a multitude of features, including a complete

scripting language Crosstalk Communications said that Crosstalk XVI's strong following more than 18 months after the release of Mk.4 bas prompted the company to con-tinue full support for the older

While Crosstalk Mk.4 offers the maximum power for communications applications. Crosstalk XVI is still the popular choice for general-purpose communications," said Chuck Rudolph, marketing vice presi-dent of Crosstalk Communica-

Rudolph said many users primarily want telecommunica-

the company said. "A single SRS-300 and a basic-rate line

can replace a pair of expensive high-speed synch modems, as

well as eliminate the need for

conditioned analog lines," Wolf

The SRS-300 adapter pe

vides access to the ISDN B

channel through a pair of RS-

232C connectors. The D chan-

nel supports X.25 packet switch-

ing with an assembler/disas-

sembler at speeds between 300

and 19,200 bps. This feature can

#### The latest version of Crosstalk is priced at \$195. Users who purchased Crosstalk XVI on September 15, 1988, or later may obtain a free upgrade. Users of earlier versions can upgrade for \$30. Update re-

on-line services, bulletin boards

and databases and don't want

the extra features offered in

and unload and await incoming

calls in the background was the

most requested feature for

Crosstalk XVI Rudolph said

Other enhancements include

full DOS path-name support, a

new manual and a revised

command-line editor that per-

mits recall edit and reenter

commands through the use of

The capability to download

quests should be accompanied by a return authorization ob tained by calling the update department at the number below, according to the company. Crosstelly Communications

Inc.,1000 Holcomb Woods Parkway, Roswell, GA 30076: (404) 998-3998.

Tops to Release Terminal Program

## To Public Domain Tops Inc. has decided its Tops

Terminal program does not fit the company's long-term strate-gy and plans to release it into the public domain, according to a company official.

Tons Terminal connects Tops networks to TCP/IP-based networks, permitting users to

conduct multiple host sessions simultaneously Tops, a division of Sun Microsystems Inc., had initially

planned to release the product in the fourth quarter of 1987. The price of the Tops Terminal was to have been \$189. The company decided oot to commercially distribute the pro-

gram because it thought it might interfere with Sun Microsystems' strategy to integrate Sun's Network File System and the Tops network, said Kim Tarter,

public relations manager at Tops. Tops Terminal will be distributed on bulletin boards possibly starting in January, Tarter

Tops is currently in negotiations with an unnamed univerty to take over support of the program.
Tops Inc., 950 Marina Villigo Fankway, Alimetels, CA: 94501; (415) 769-9669.

when connected to 10-MHz background while running other applications the performance available with the ESDI interface. The controller will support future 15-MHz drives that are

expected to reach data transfer rates of more than 1 400K per The CNT-MCA controller comes with drivers for the Novell SFT system and is priced ed \$595

ESDI drives

Confirmation of Core's compatibility claims was not available at presstime, with Novell unable to verify whether its technicians had tested the Core board with SFT Netware. An IBM spokesman said the com-

nany does not reveal the results of tests performed on its machines using third-party software and hardware. Core International, 7171 N. Federal Highway, Boca Raton, FL 33487; (407) 997-6009.

In what it claims is a major ISDN price breakthrough, Fu-

nous support on all lines Drum The SRS-300, which lists for said. The instruction set is completely compatible with the company's Micro Channel version of the board, the DCP-186/MC. Thus, system software designed for one board will work

on either the PC bus or the Micro Channel bus without most necessary ingredients, such as the Fujitsu LSI technology, but sneds the "bells and whis-The DCP-186/PC board will ties" in higher-end Fujitsu prod-ucts, such as the LCD and segin shipping in February for \$1,395, according to the comanalog telephone interface that ables fax or voice messaging. Evules Corp. 3545 Harber Blvd., Costa Mesa, CA 92626; (714) 662-5600.

be released in February 1989.

Fujitsu America Offers Low-Cost SRS-300 ISDN Terminal Adapter BY JEFF ANGUS provides the performance equivalent of two 19.2-kbps modems.

added

jitsu America Inc. is now offerine terminal connections for \$363 per port in its new SRS-300 dual-port ISDN terminal

\$725, was engineered to meet the needs of low-end cost-conscious users, according to Fujitsu manager of product marketing Dean Wolf. The SRS-300 keeps intact the

The SRS-300, scheduled to

provide access to Centres-based modern pools in central offices for connection to non-ISDNconnected computers, according to Fuitte Fuitsu America Inc., 3055 Orchard Drive, San Jose, CA 95134; (408) 432-1360. - Jeff Angus

- Laurie Flynn

#### Emulex Board Acts as Gateway Solution

Users who want to use their dumb terminals for network access through a gateway will

soon see a number of products based on a coprocessor board to be shipped in February by Emulex Corp The DCP-186/PC is a cor

cessor board designed for PC-compatible computers. Based on a 10-MHz Intel 80186 processor, the board provides timers, an interrupt controller, two channels of direct memory access, and either 128K or 512K of memory. A daughterboard has four full- or half-duplex RS-232 serial ports that can be used either synchronously or asynchronously. The daughterboard also has one Centronics-compatible parallel printer port. The DCP-186/PC is designed

for custom gateway solutions, with up to four beards assumed in the gateway PC and each board supporting up to four

The product may not address

#### **NEC Offers** Two V.32 Modems

NEC America Inc. recently in-troduced two high-end V.32 modems, including one that can be upgraded on-site by the user. The top-of-the-line N9635 is a 9,600-bps device that con-forms to the CCITT V.32 and

V 22his standards, the company said. A replaceable "personal-ity" module permits users to upgrade the modem as new standards are adapted, said Marty Likier, NEC's product manager for dial-up modems. The first module, expected in mid-1989, is a callback security feature and will be fallawed by an error control module using the CCITT V.42 standard.

The N9635 is downward compatible with existing modems that operate at 300 bps or more, NEC said. It also provides effective 19.2 kbps. using built-in Microcom Networking Protocol (MNP) Class 5 data compression.

An optional removable mod-ule with a liquid crystal display permits the modern to be programmed without the use of the



upgrade the N9635.

computer and without throwing switches. The Display/Control module contains 32K of static RAM and its own Intel 8031 processor. Diagnostic routines, such as signal-to-noise ratio tests, can be run on an unlimited number of N9635s remotely from one modern equipped with

the display, according to the Scheduled to ship in March, the N9635 is priced at \$1,595 with the control module, and \$1,495 without. The display module is also sold separately for \$150.

The company also announced the N9631, a V.32 9,600-bps modem with downward compatibility with existing 300- to 2,400-bps modems. It also includes MNP Class 4 protocol. It is priced at \$995 and will begin shipping next month, NEC mid NEC America Inc., 110 Rio

Robles, San Jose, CA 95134; (408) 433-1250

ship it to PC users working on

LANs connected by gateways," said Arnold Mazur, president of

Computer Associates' informa-tion products division. "If a project is a group effort, contrib-utors can simply drop in their

suggestions as the report makes

it rounds. It's a great time-

The new release comm

cates with mainframe CA Email

asynchronously and synchro-

nously. All screens, keystrokes,

and commands are identical to

CA Email on a 3270-type device. Users have access to all CA

Email functions, using either pop-up menus or CA Email

under CICS (Customer Infor-mation Control System) in MVS or VSES environments.

MVS/TSO or ROSCOE in MVS

environments, or VM/CMS. PC Email File Transfer costs

\$195 per workstation, plus a

one-time gateway charge of

Computer Associates Inter-

PC Email File Transfer requires DOS 2.0 and CA Email, Release 3.1A or later, running

saver." Mazur said.

DCA Ships Data Transfer Package High-Speed Program Links IBM System 370, PCs, PS/2s, Macs

\$1,800.

#### BY ROBERT SHOWDON JONES

Digital Comm ciates Inc. (DCA) began shipping last week the cornerstone of its new line of faster micro-tomainframe links: a high-speed data-transfer program for the IBM 370 mainframes, PCs, PS/2s, and Apple Macintoshes

The package, called FT/Express, uses an algorithm to speed up transfers through the mainframe's controller. It also compresses and decompresses files on the fly, said George Moore, general manager of mainframe communications products for DCA's personal computer com munications group. Depending

on system configuration, the software transfers files at five to 12 times the speed of its current Irmalink and Fortenet file-transfer products, DCA said.

FT/Express supports DCA's Irmax DFT, Irma CUT, the Irmaian SNA-SDLC connections, as well as the Mac interface. The package is also operational in Irma Remnte nr Irmacom II SNA-SDLC for remnte-site transfers. cles, nnt connect time FT/Express costs \$9,000 per aimframe CPU running VM/ CMS or MVS/TSO, including

mainframe software and a P

software site license. A required

annual maintenance fee costs

nsmission cost issues, even if it decreases transmission time according to Karl Konnerth, a senior technical specialist at Syntex (U.S.A.) Inc. He said the DCA technology FT/Express re-places — FT/TSO — is expensive, with a charge-back fee of up to \$100 per 1-megabyte file transfer. The charge back is based on mainframe CPU cy-

> FT/Express will be valuab if it saves mainframe CPU cycles used, not just connect time, Knnnerth said. Otherwi he'll continue to use the IBM connection utility with which he recently replaced FT/TSO.

> > anced twisted pairs

(four wires total) in a

shielded enclosure.

Type I cable is used

between faceplates in

work areas and wiring

closets, or between two

wiring closets in the

e or different buildings.

ed twisted pairs, and four more

twisted pairs outside the shield casing but still inside the vinvi

outer casing of the cable. The shielded pairs are used for data, while the unshielded pairs carry

voice. Type 2 is used between

faceplates in work areas and wiring closets in the same building.

unshielded twisted pair. Any-time IBM specifies Type 3

cabling, regular telephone wire

will serve as well - and at vastly

fibers for use on a high-speed network backbone within or

Type 5 cable has two optical

Type 3 cable has a single

Type 2 cable has two shield-

#### **CABLING SCHEMES**

## Network Vendors Push Their Own Cable

BY MARK STEPHENS hen setting up a local area network, there is no rule that says the wire has to come from the same source as the adapter cards, workstations, or servers. Yet a number of large network vendors have found it useful and profitable - to push their

own individual flavors of cable. The pioneer of cabling schemes is AT&T's Premises Distribution System (PDS) In 1964, it was easy for AT&T to specify what wire could be used with its telephone equipment because AT&T actually owned both the wire and the telephones attached to it, to the extent that AT&T even claimed ownership of the wire in building walls.

POS FLOURISHES. Since AT&T was both the specifier and customer for this wire, PDS flourished and was ultimately adapted to use when computer networking came along AT&T's Starlan local area net1-mbps version of ) Back Etheroet, specifically modified to run on ~ To PDS unshielded twist-

ed-pair wire. Basics Most PDS cable is unsbielded twisted pair, using essentially the same individual wires, bundled in cable ranging from six to bundreds of wire pairs. For long-

distance trunk service, fiber-optic cables have been added to the PDS rolls in recent years.

VARIATIONS ON A THEME. The IBM Cabling System was intro-duced in 1984. Similar to PDS, IBM selected a system connecting office wall outlets to centralwiring closets. This star-wired system can be used for both data outlets - 3270 or 5250 terminals attached to a mainframe and PCs connected to an IBM Token Ring LAN — and tele-

The cables are all variations on the twisted-pair theme -some with shielding, some with-

lower cost. between buildings.

Type 6 cable is a doubly Type I cable has two balshielded patch cable generally used within wiring closets. It contains two twisted pairs.

Another structured cabling scheme that uses a similar topology to IBM's, but goes far beyond it in function, is Digital Equipment Corp.'s DEC-Coonect. Like IBM's scheme, DEC-Connect uses a star topology, spreading from wiring closets, but it has four separate outlets on each wallplate: unshielded twisted pair for telephone, shielded twisted pair for data, thin Ethernet for the LAN, and a

broadband outlet for video. The idea is that all information services in an office can be connected through the same cable run and connection. DEC-Connect does not, however, use some futuristic broad-band, baseband, twisted-pair super cable to deliver all four signals. Four separate cables connect to the wallplate.

#### PC Email 2.1 Converts Word Processing Files Provides Access to Mainframe, PC Users

BY SCOTT MACE

Computer Associates recently announced Release 1.2 of its PC Email File Transfer program. which now supports the conver-sion of Word Perfect, Wordstar, Displaywrite, Multimate, and other leading word processing packages to the PC Email

PC Email File Transfer allows mainframe and personal computer users to access documents created by popular word processing packages and distribute them throughout an organization, according to the PC Email File Transfer users

can update and view Revisable Format Text/Document Content Architecture (RFT/DCA) and Final Format Text/Document Content Architecture (FFT/DCA) documents. RFT/ DCA documents can be downloaded to other PC users for editing and updating, the company said. Users can upload and download any hinary file, including spreadshoets and other "A mainframe terminal user,

\$2,500 national Inc., 711 Stewart Ave., Garden City, NY 11530-4787; (516) 227-3300.

work is, in fact, a slowed down

**Proprietary Cabling Schemes** IBM Cabling System DEC-Connect Faceolate 25 300



# EVERYONE'S DOING IT.

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In a recent industry survey\*, two-



thirds of the respondents who intended to buy a DBMS did not intend to buy dBASE.

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buyers have used another DBMS before.

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(PBE) lets you pointand-pick, then R:BASE does the work. When you find that you're repeating yourself, you automate simply by recording

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and Software Digest all just gave R:BASE
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You can use its English-based language in command mode, to modify programs R:BASE writes for you, or to write your own solutions from scratch. Single menus, prompts and "paint-

Single menus, promptis and "painthe-screen" techniques make sophisticated screens, forms and reports quick and easy to create. With RebASE forms, you can view and update data from sevreal tables at the samet time. Create computed fields. Include scrolling regions so you can work with all the data from other tables. Add rules for data integrity. And RebASE is relational, so your

rules stay with the tables-applications

can't avoid or change them. And forms can be set up to cascade changes through related tables. So you can trust the information you get.

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R:BASE is the secondlargest selling PC DBMS in the world, and it's backed by all the training, service and third-party suport you'll ever need. It's providing end-users

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At Work de

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Featuring speed, expandability and compatibility, the 12MHz 80286 can be expanded up to 8MB, with all eight accessible at 12MHz. The 80386, equipped with eight expansion slots and up to 620MB of mass storage, has the memory to map out any application.

to map out any application.

With the Vectra PCs, zoning information can
be quickly and easily accessed, updated and
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rehitest and homeouners are allower lepts.

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# SOFTWARE

#### CATALOGRAPH RECEIPE WHEN AND THE COLORS = 6% program to = generate four now = unrichments from the = pattern and data. a B C D E F C | C | Interestional Midget Series Sales Forecast \$23, 636 \$40, 175 \$44, 675 \$22, 756 \$65, 386 \$38, 675 WEST ROVE 4 9 10 WEST CHLACTIC 32 37 30 WEST CHLACTIC 22 57 30 ENCINE 2 5 5 6 ENLACTIC 20 22 24 24 ADE 27 24 20 30 Place Place Place House Make

Circle Systems' 4GL Roundtrip works with 1-2-3 to consolidate n or distribute data among several worksheets

## 4GL to Access. Manipulate Lotus Spreadsheet Data

Circle Systems Inc. plans to ship early next year what it claims is the first fourth-generation language designed to access and manipulate data in Lotus spreadsheets

The product, called 4GL Roundtrip, can move data among spreadsheets and manipulate it using a simple "nonulate it using a semper.

procedural language, according
to the company. With only a few
lines of English-like code, users many spreadsheets into one master worksheet - complete with totals - or break a master spreadsheet into several spreadsheets for distribution, the com-

4GL Roundtrip also works with Dbase files and can identify

the contents of data records by reading Dbuse's data dictionary, according to the company. The program also reads and writes files in 1-2-2, 5, mploon, Deag.

Soft Library Ships Applications Collection Micro Systems Inc., Mail-Track-II from Sapana Micro Soft Library Corp. released Inst nth a grab bag of 30 busine and personal enrichment pro-grams from different vendors

that run under a master menu. Soft Library includes programs in every major category. Among the programs are Life-tree Software Inc.'s Words & Figures spreadsheet and Volkswriter Deluxe Plus word processor, Powerbase Systems Inc.'s Powerbase database Reference Software Inc.'s Grammatik II grammar and spelling checker, Media Cybernetics' Dr. Halo III graphics package, and Soft-klone's Mirror II communica-

It also includes such productivity packages as the Protracs project manager from Applied Track-II from Sapana Micro Software, Easy Text & Graphics Plus desktop publishing pro-gram from Savtek Corp., and Curve Digitizer CAD package from West Coast Consultants. Utility and training programs in the collection are the Prime-

The product can be used to

consolidate departmental bud

get worksheets into corporate

monthly projections, update several portfolio evaluation

worksheets at once from a single

file containing the day's stock

quotes, or create a sales summa-

ry worksheet from Dhose sales

history files, the developer said.

interactively, or users can write

applications to execute later

PS/2 compatibles with 256K of RAM and DOS 2.0 or later. It

RAM and DOS 2.0 or later. It works with all versions of 1-2-3.

Symphony, and compatible pro-

\$195, which includes a free 1989

update that supports Letus 1-2-3, Release 3.0.

Fourth Ave., No. 3200, Seattle

WA 98154; (800) 456-4451, (201) 662-3763.

Circle Systems Inc.,

4GL Roundtrip will cost

from a menu The package runs on PC and

grams

4GL Roundtrip can be used

time calendar/scheduler from Primetime Software Inc., Pop-Up Deskset utilities from Popu lar Programs Inc., 1Dir DOS shell from Bourbaki Inc., and the Teach Yourself DOS tutorial from American Training International. The program also includes Infocom Inc.'s Zork I adventure game.

The programs are the same rsions as those sold separately, and will continue to be developed and marketed by their software companies. Each ven-

# 1988: A Good Year for Vaporware

#### RY PROGY WATE

Most of the major software

developers left a couple of ghost packages sitting on the shelves this year, along with the solid Probably the greatest vaporware producer was Lotus, which has discussed or announced such still-unreleased oducts as 1-2-3 Release 3.0, 1-2-3/G, 1-2-3/DBMS, and 1-2-3 Release 2.X. In September, Lo-tus still promised Release 3 by

the fourth quarter, in November it said second-quarter 1989.

But Lotus also delivered Users cheered its May decision to drop copy protection. Updat ed (on time) were Symphony in February and Freelance in De-

cember. Lotus released Agenda in July, eight months after unveiling it. Database leader Ashton-Tate won a few and lost a few. In October, the delayed Dbase IV

shipped to eager users - some of whom now point to bugs and complain the product still isn't really out. Ashton-Tate warned in November that SOL Server, which is in development with Microsoft and Sybase, would be delayed until February. But Mi crosoft shipped the development kit in early Novemb Ashton-Tate also shipped Step IVward, its clone code convert er, and Framework III in August

Microsoft and IBM kept

their OS/2 schedule, shipping

Extended Edition 1.0 in July and I I in November IRM sh ped the buggy PC-DOS 4.0 in July and an update in Septe ber. Microsoft waited until October to ship MS-DOS 4.01. Microsoft updated Multipl

and Word for OS/2's competibility box, but its full-blown te, Word 5.0, missed 1988 and Microsoft's new projected ship date is January 8. Announced in February and released on time in March and April were a host of language updates that also support OS/2. However, users still await the nouncement of Microsoft's

Windows-based word process which was shown in the U.K. Samna Corp. beat Microsoft out See 1988, Page 17

#### FOREIGN LANGUAGE SOFTWARE

### Developers Begin to Eye Global Market

BY PAULA S. STONE oreign language versions of applications, ranging from support for other alphabets to translation packages, are appearing from developers eveing the global market

Word processors in particular are being designed for varied foreign languages, with separate foreign versions mudtilineual releases, and translation utilities, according to John Murphy, senior consultant and special projects director of the market research firm of Wohl Associntes, in Bala Cynwyd, Pennsyl-

Corporations' need for foreign language capabilities de-pend on such factors as their applications and locations of beadquarters and remote of-

dor will continue to support its own application, even when packaged in the collection.

All appear and can be called up under the Menuworks mas-

ter menu program, according to

Soft Library, which rewrote doc-

umentation to conform to a similar format.
Soft Library runs on PC
compatibles with 512K of RAM

and a hard disk. Its library

(800) 358-5858

ple, banks with foreign branches and organizations that deal with foreign governments need and use programs with foreign langueer canabilities. It is considered polite and belps them make a better presentation in the native language, according to Murphy.

Vendors usually follow with an international version of the software six to 18 months after the introduction in the United said Steve Wendler, program director for the Gartner Group, a Stamford, Connecticut, research firm. Murphy said software vendors first cross the border to market in Canada, then typically turn to Western Europe. South America and Fastern Furnne Rilingual Canada requires government documents in both Frelish and

"The most difficult language to develop fsoftware forl to develop [software for] is Kanji, the Japanese alphabet. It has several hundred characters that are stylistically artistic See Languagus, Paga 17

#### Foreign Language Versions Available Ashton-Tate's Multimate Dutch, English (Australian & U.K.) French Advectage E German, Italian, Spanish (Castilian &

Latin-American), Swedish Dec Easy Word 3.0 Dutch, English (U.K.), French, Spanish (more in 1989)

Foreign Language Editions

Displaywrite 4, 1.0 (DOS) Danish, Dutch, English (UK), Finnish Displaywrite 4/2 (OS/2) French, French Canadian, German, Italia Norwegian, Portuguese, Spanish, Swedish

Lotus Menuscriot 2.0 Dutch, English (U.K.), French, German, Swedish (Spanish in 1989) Same as 2.0 plus Italian Lotus Manuscript 1.1 Dutch, French, German, Italian Samoa's Ami (first quarter 1989) Samon Word IV (DOS) Dutch, English (U.K.), French, French-

Sprint by Borland Fortish (LK), French (German, Special) Word Perfect 4.2

Denish, Dutch, English (U.K.), Finnish, French, French Canadian, German, Ioelandic, Italian, Norwegian, Portuguese, Spenish, Swedish includes Sim-CGA, color graphics simulator software for users without a CGA card. The introductory price is \$299, which will Word Perfect 5.0 English (U.K.), French, French Canadian, increase to \$399 after March 1. Norwegian (Version 4.2 languages, except

Soft Library plans to release icelandic and Italian, first quarter 1989) similar collections for Mac and Word Perfect for the Macintonh Danish, Dutch, French, French Canada Apple II systems in June (first quarter 1989) Library Publishing Corp., 607 W. Broadway, Fair-field, IA 52556; (515) 472-9800, Xywrite II French, German, Italien, Spanish (ell avallable for Xywrite III Plus in 1989)

BY SCOTT MACE

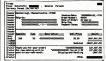
#### Concentric Data R&R Update Has Dbase IV Support

Concentric Data Systems Inc. began shipping last month an undated RAR Relational Report Writer that supports Dhase

The R&R Relational Report Writer lets Dbase users create reports, including relations, calculations, and layouts not possi-hie with the Dbase IV report

writer, the company said The program can relate files using complex expressions, do dsheet-like calculations, splay a page preview, suppress ortions of a report using if-then ogic, and print multiple records ross a page, according to the

R&R also works with Dbase III, Dbase III Plus, and Dbase



Concentric's updated R&R Relational Report Writer supports Doese IV with commands lacking from the Ashton-Tate product.

file-compatible programs. An optional R&R Clipper and Foxbase+ module also supports those file formats. R&R's royalty-free run time lets developers arently run R&R reports from the several database systems using 25K of memory Registered users of R&R, Version 3 will receive free up-

grades to the new R&R, Version 3B, which costs \$149. The R&R program runs on PC compati-hles and requires DOS 2.1 or later and 320K of RAM. The Clipper and Foxbase+ module costs \$49.95. Concentric Data Systems Inc., 18 Lyman St., Westboro, MA 01581; (508) 366-1122.

#### **Dac Software Ships Dac Easy Word Update** Interfaces with Dac Easy Payroll, Accounting

# Duc Software Inc. began ship-

ping last month an update to Duc Easy Word that can ex-

change data with the Dac Easy

Payroll and Accounting mod-

Users can merge data from Dac Easy Word, Version 3.0

and the customer, employee, and vendor files in Dac Easy

Payroll and Accounting, Ver

sions 2.0 and 3.0, said Jeff

Seigfreid, the company's prod-

The program's new capabili-ties include an "undelete func-tion," to restore a deleted word

or line, and new mailing-list

record management commands Users can modify the list struc

ture by changing the position of fields on a screen, said Seigfreid.

Other new functions res

uct development manager.

records and "pack" them to conserve disk space A new punctuation-correction feature detects open-ended

parenthetical phrases and incomplete sentences that begin with lowercase letters, he said. The spelling-checker function can be stopped to return to the editor, then later resumed at the same point, Seigfreid said. The update is also available

in Dutch, Spanish, and French, Other language versions are scheduled for release early next year, according to the company.

Dec Easy Word runs on PC empatibles with 256K of RAM and DOS 2.0 or later. It still costs \$69.95, with \$25 upgrades

available for registered users of Version 2.0. Dac Software Inc. Preston Road, Suite 800, Dallas, TX 75252; (214) 248-0205. urch Block Mindou Dictionary Nacre



izisoni zwoni zwoni zwo 

Dac Software's updated Dac Easy Word, Version 3.0 can merge word processing flies with data from other Dec modules, Dec Easy Payroll and Accounting, and Into a single document.

#### Sheng to Ship Compilers for 1-2-3 Jaguar, King Jaguar Offer Enhanced Debugging, Programming Tools

Dy less Assess The products support all The debugger also supports 1-2-3 functions, macros, and formulae, except Lotus &-for-Jaguar and King Jaguar, a pair of compilers for Lotus 1-2-3 dow-motion execution, four watch points, and three kinds of

spreadsheets, are due on the break points: conditional, trace, market in February with en-hanced debugging features and other sophisticated programand standard stop-when-arive. Jaguar, the \$395 basic prod-uct, also supports EMS. King Jaguar, the \$595 advanced prod-The products from Sheng Labs Inc. provide features not yet available in 1-2-3 compilers and a symbolic debuseer, said

uct, adds such features as sup-port for user-defined C functions as in Sheng's Quicksilver compiler for Dhase, a library to Richard Sheng, company presi The dehugging environsupport sideways printing, and ment provides a pair of winvirtual memory to allow largerthan-memory spreadsheets to one showing the macros and formulae and the other the run in their compiled versions.

mulae, Sheng said. The com-piled spreadsheets provide faster because executable spreadsh don't require the 1-2-3 prod and better program secu

The company plans to add background recalculation and other new features to future versions, Sheng said. Sheng Labs Inc., 4470 S.W. Hall St., No. 282, Beaverton, OR 97005; (503) 646-3691.

dems, can dial access codes

Contactmate prints any size

for long-distance companies.

# Mindscape Releases Contact Manager

Mindscape Inc. recently released a new personal contact manager program that is designed as an entry-level tool for profession-

The product, called Contact-

mate, answers such questions as CONCOCTRATE

Hert cour! CALL IN 65/29/95 18:20s

Phinip Selevented in South American art, and anything suggestive of sum and send

recent conversation with a husi ness or personal acquaintance?" the company said. Contactmate also sorts through information in all contact files to flag a scheduled call or visit. The program can also dial calls and, when used with some ......12/28/98 98:21a

of continuous-form mailing la-bels and Rolodex cards from rmation in the user's files. It includes an expense tracker to organize husiness and personal The \$49.95 personal cor manager program comes with

ide, on-screen help, and 90 days of free phone Contactmate runs on PC compatibles, including laptop com-puters, with 512K of RAM puters, with 512K of KAM. Each package includes both 31/s-and 51/s-inch disks.

The Contactmate program was developed by Practical Soft-ware, in Clearwater, Florida. The company has designed a series of personal productivity programs that Mindscape also

Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062; (312) 480-7667.

#### Zedit Offers Ease of Use. Speed in Compact Program one key to automate ma

Telecom Library Inc. recently released Zedit, a small, fast, \$59.95 word processor with an

Perfect, but can be tailored to

macro generator that permits

pond to word processor com-nds, Acher said. Zedit has a

because of its small men requirements and speed, as well interface that can be tailored to emulate more full-blown packas its oversize cursor that is easier to see on laptop screens. Billed as a "front end" for a word processor or desktop pub-lishing program. Zedit lacks Zedit can handle as many lishing program, Zedit lacks advanced formatting and printfiles at once as memory perr

Acher said. Users can open eight ing features but is a compact 52K program that instead offers once to view eight different files speed and ease of use, said Ron Acher. a Telecom Lihrary or up to eight views of the sam file. They can also copy and paste words between loaded files, he said. The program keeps The word processor comes configured to operate like Wordstar Professional or Word all deletions of a session in memory and can restore them

> Telecom Library Inc., 12 W 21 St., New York, NY 10010: (212) 691-8215.

Telecom Library

Zedit as well-suited for laptops



## Languages

Continued From Page 15 Wendler said. "It is a formidable barries to marketing U.S. word processors, docu-ment retrieval, and related software in Japan, and is [a reason] why fax is so popular," be said

INES FOLLOW. Foreign langua dictionaries provide spelling checkers and sometimes a thesaurus to supplement native language editions, analysts said.

Nearly all major word processing vendors said they now ship or plan to offer an extensive selection of foreign language dictionaries for use with native aguage word processors Foreign language capabilities are most

esirable to multinational companies or an organization's international depurtment, said Alan Minard, senior product manager for Lotus Manuscript. Companies use the American-English version to create documents used for non-English-speaking parts of the organization, then check spelling with the foreign language dictionary, he said

A large New York bank chose Manuscript for its foreign language capabilities because the bank had many international dealings, and the staff was pleased to interact with their overseas customers in their native languages, Minard said.

ATIONAL FIRMS INTERESTED. Unlike language dictionaries, language editions are complete, reworked packages pro-

duced in another language. "Foreign language versions are full localizations of the software," said Said Mohammadioun, Samna Corp.'s CEO. Development involves translating documentation, screens, messages, and lansuper-related elements such as the

#### 1988

Continued From Page 15

the door by announcing the Windowsbased Ami in October and meeting its December release

But the word processor that users waited for the most, Word Perfect 5.0, went out the door in May — after several delays since its January announcement — and was followed by several bug fixes.

A long list of products came from Borland International, which released Sidekick Plus in February, Sprint in June, Sidekick Fuss in returnary, spetts in Junia and Paradox/386 in Fehrurary, with SQL versions previewed in the fall. New Turbo languages included a Prolog update in May, as well as new versions of Pascal and and the awaited debugger/assemb all announced in September and shipped on schedule in December.

Computer Associates announced and

shipped products almost monthly. Superproject Plus 3.0 came out in February. Accounting modules appeared throughout the year, and Superproject Expert/2 for OS/2 was unveiled in March. However, Supercale 5.0, announced in June, missed its December release date and is now due in the first quarter. Also filling shelves was Software Pub-

lishing, which shipped most products upon announcement. They included uptes to Harvard Graphics, Project Manseer, and Professional Write and File. Still in vapor is the engine for the Emerald Bay database, announced in March by Migent.

esk announced Autocad 10 in May and shipped it in October.

dictionary, hypenation, and decimal alignment conventions, he said. Marketing staffs in multinational companies most often use foreign editions. William Blair & Co., a Chicago-based investment firm, uses the American-English version of Lotus Manuscript 2.0

to electronically exchange documents between its Chicago and London offices. 'It is most beneficial to have staff in both locations trained on one product and using the same systems," said W.N. Burdick, computer services manager. The company is considering using other language editions to facilitate communicans with other countries, Burdick said. The National Film Board, in Montreal, Quebec, has 26 Canadian offices and uses both French and English versions of Samna Word and other word processors to produce documents exchanged with branch offices in France, the United States, and the United Kingdom, said Robert Gendron, chief of management

"Most of our Canadian employees are bilingual," Gendron said. "Those that are unilingual prepare documents in the mother tongue [English or French] to distribute in the native language of the branch office.

Some vendors find a demand for foreign language versions or English versions with foreign language dictio-

aries in the academic comm People in the education environment often want to switch between languages, said Mark Pauker, Borland's product manager for the Sprint word processor The University of Virginia, in Charlottesville, provides its information center users with Word Perfect 4.2 in German as well as English, said Tony Townsend, systems analyst for academic computing. The school is also preparing a Macintosh lab that will run a number of English-language programs that support foreign language dictionaries, including Chinese and Arabic, special on-screen characters, and printer support, Town-

send said

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(outside Oklahoma)

# HARDWARE



Packard Bell's 12-MHz 286-based laptop weighs less than 15 pounds and features a 1.44-megabyte 34-inch floopy drive.

#### Packard Bell Enters Laptop Market With 12-MHz 286-Based Machine

Packard Bell recently entere the growing laptop computer market with a 12-MHz 80286based machine featuring a backlit CGA-compatible dis-

Weighing less than 15 ounds, the PB 286-LPT laptop ntures I megabyte of RAM, a 1.44-megabyte 3%-inch floopy drive, and a 20-megabyte 28-millisecond hard disk, the company said. A 40-megabyte disk is to available.

The laptop's backlit CGA display is a high-contrast black-and-white LCD with a cold cathode fluorescent tube that provides eight gray-scale levels and reverse video in a 101/2-inch viewing area with 640-by-200 on, the company said.

The PB 286-LPT include one serial and one parallel port, sockets for an 80287 math coprocessor, and an internal

The laptop's memory is expandable to 5 megabytes in either I-megabyte or 256K in-crements, according to the company. The portable also includes a

port for an external monitor, nne 5%-inch finppy drive, and an AC adapter/charger. The laptop includes an 82key keyboard, rechargeable bat-teries, and a 110/220-volt AC 50/60-hertz autoswitch adapter, charger. The adapter/charger has overcharge and cycling profor the LCD, backlighting, hard disk, internal modem, and processor speed, the company said. The PB 286-LPT also includes MS-DOS 3.3 and GW Basic and supports OS/2, Version 1.0, the

company said. Packard Bell, 9425 Can ve., Chatsworth, CA 91311;

# Firms Create SCSI Interface Spec

FASST Intended to End Need for Hardware Register Compatibility

system, integrating SCSI onto a motherboard, without worry about device incompatib Second, FASST allows devices attached to the SCSI oter to be run under MS-DOS, Unix, Windows, Netware, and OS/2. The software also

Western Digital's SCSI adamters. Currently, FASST software is designed to work with SCSI controller cards and Western Digital chips although it is probable that other developers will produce SCSI boards that

can work with the FASST soft-Device sharing is also possi-ble, Bonner said. Most Mac

oberals that use Apple's versinn of SCSI will work on PC-AT-, and Micro Channel-cor patible computers using FASST. works with MCA versions of In addition, a number of major SCSI device manufacturers have already announced they will implement drivers that sup-

port the SDLP interface. Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714; (714) 863-0102.



Using the SDLP interface as a design platform, application developers can easily interface all of the popular operating systems to multiple peripherals that have similar but different SCSI interfaces (CD ROM devices, for instance).

ALR's 386SX PC Uses

# 82385 Cache Controller

Advanced Logic Research is now shipping in limited quanti-ties a 386SX-based computer system that uses Intel's 82385 cache controller chip to achieve the fastest performance of any ster currently based on the

The system, called Flexcache SX386, operates at 16 MHz and is based on the Intel 386SX, a processor that provides many of the features of the 80386 chip, yet uses a 16-bit data hus.

The addition of the 82385 cache controller gives the system improved performance by elim inating wait states 95 percent of the time, the company said makes the Flexcache SX386 35 percent faster than Compaq's 386S computer, the company

The system features one serial and one parallel port on the bond (requiring to additional curds or slots). The system board also contains the circuitry for the floppy disk controllers. The standard configuration includes I megabyte of memory but is megabytes. In addition, the system features six slots - five of which can accommodate 8-bit or 16-bit expansion cards — and one

8-bit slot. A 1.2-megahyte floppy disk drive is also standard. The system can house a total of four 5%-inch or 3%-inch storage devices. The system also occupies a small footprint (6 inches by 16 inches by 17 inches) and has a front-mounted power switch. Two versions of the ALR

Flexcache SX386 are now ship ping in limited quantities. The ALR Flexcache SX386 Model 10, which is the company's base unit and lacks a hard disk drive and hard drive controller, selfs for \$2,395. The ALR Flexcache SX386 Model 40, which in-cludes an MFM controller with look-ahead caehe and a 40-

megabyte hard disk drive with liseconds, is available for \$7.004 Advanced Louic Research Inc., 9401 Jeronimo, Irvine, CA 92718: (714) 581-6770.

Western Digital Corp. and Co-lumbia Data Products have developed a software specification that allows developers to easily interface their peripherals to a

SCSI interface and to operate the devices under a number of operating systems. In the past, a number of companies have implemented SCSI adapters for PC- or ATclass computers, said Bruce Bonner, a marketing manager at Western Digital. But the adapters would only support a single

device because a SCSI adapter is designed to support up to seven daisy-chained devices, while a rticular adapter effectively limits the user to one. The problems have occurred

when interfacing additional de-vices — such as hard disk drives, streaming tape drives, or CD ROM drives - to the SCSI boards, because each board used its own proprietary hardware registers, and each device was written to interface with a pur-

tieular board. The new spec, called FASST (Flexible Architecture Standard System Technology), is a standardized set of software registers, which is intended to replace the need for hardware register

compatibility, the comp said. FASST implements a Standard Device Level Protoco (SDLP) interface. The FASST software handles interfacing be-tween the peripheral and the attached SCSI adapter. Thus, a peripheral can be developed that makes system calls to the FASST software, which in turn handles interfacing to the board This approach solves two

problems, the firms said: First, it allows a user to upgrade from an 8- to a 16-bit SCSI adapter without worrying about incompatibilities. A system designer can even use a SCSI chip on a

#### Optex Unveils Development of Fast Rewritable Optical Drive BY SCOTT MACE son why we cannot be compara-ETOM has attained more than bly priced to magneto-optical

drives by that time "This early dynamic test already shows the ETOM media

tn be significantly faster than magneto-optical," Lindmayer said. The speed of a magne optical system is limited by the pend to heat the media to cha its magnetic properties. The inherent speed of the ETOM media — less than five nanoseconds - means that the averall

system speed is limited only by the speed of other components." Also, the physical phenome-non suggests that media life may be practically limitless. Lind the practically limiteess, Lind11 million read, write, and crase cycles without any degradation,

In its first test, read and write lity was demonstrated with write signal pulse durations as short as 200 nanoseconds and a pulse repetition rate of 2.5 MHz, the company said. Rotat-ing the disk at 1,800 rpm corresponds to a write and read data rate of approximately 4 mbps Optex anticipates a next-level write and read data rate of 15 megabits per second, with fur-

ther increases expected. Optex Corp., 2 Research Court, Rockville, MD 20850-1301/8/040011.

INFOWORLD

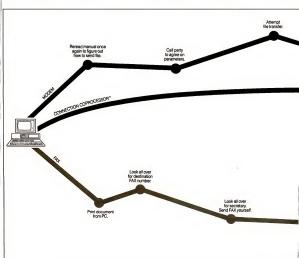
#### Optex Corp. recently an-

naunced the development of an Electron Trapping Optical Memory (ETOM) rewritable optical drive that has a potential read/write speed of 4 megabits per second

The Optex drive is much faster than the 2.8-megabit maximum transfer rate that has been announced for magneto-optical drives, said Joseph Lindmayer, Optex founder and president. We expect to have a com-

mercially available product by the end of 1991," said Anthony Clifford, director of corporate development. There's no rea-

# Intel announces



Announcing the first non-stop communications route between businesses anywhere in the world. Intel's Connection CoProcessor." It's a whole new way to send and receive programs, files, text,

graphics and electronic messages. Not just between PCs, but with fax machines as well. The Intel Connection is a communications

conrocessing board that frees your PC from the task of communicating. Which means you can work on your

computer non-stop-even while sending

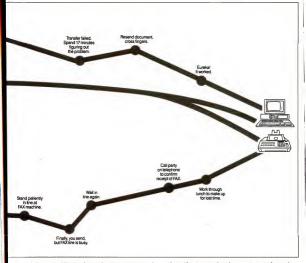
a document as big as the New York phone book. Now your faxes or files can fly cross country. And you can still be

zooming around in your flight simulator. Or writing that letter to your biggest account. Or recalculating your spreadsheets for tomorrow's meeting. Without interruption or

downtime

And when you fax, there are no more stopovers at the printer, or cooling your heels in line at the fax machine. Because Connection lets you do everything without leaving your PC.

# non-stop flights.



And when you send files directly to another Connection-equipped PC, you won't have to fiddle around with modern parameters or protocols. Because the Connection CoProcessor sets them for you. At 9600 bps.

Best of all, Connection supports CAS," a new communication standard that is supported by major software and hardware developers like Symantec," Borland," Do.S, Microsoft; and Worlderferd; "Which means you can send, for example, a word processing file to your London office, without ever exiting your Worlderfect program. You just send the document directly from your application." That's it. There's no complicated communications software to learn.

And everything is backed by toll-free technical support and a
five-year warranty from Intel.

So what are you waiting for? Call 800-538-3373 now for a free demo disk.

Because with Intel's Connection CoProcessor, communication is really going to take off.



# TI Developing Chip That May Boost **Power of Battery-Powered Laptops**

A major milestone has been reached with Texas Instrument's development of a new class of semiconductor device that could, within the next 10 to 15 years, result in a batteryoperated laptop computer rival-ing the performance of today's supercomputers.

The quantum effect transistor is fundamentally different from the semiconductor devices currently used in integrated circuits, according to Mark Reed. a senior member of the technical staff at the Advanced Concepts Branch of Texas Instruments' Central Research Labs. It is "something that researchers all over the world have

been chasing for 25 years," Reed FIRST TUNNELING TRANSISTOR. The device demonstrated by

Instruments was de scribed by Reed as "the first true tunneling transistor." The new

transistor is about 100 times smaller than conventional integrated circuit devices, with transmission speeds 1,000 times

At the small dimen the transistor device, electrons act more like waves than particles and they occupy specific energy levels. Control of current in the transistor's base allows electrons at particular energy levels to be directed to an emitter (a component part of the transistor) or to be blocked from

the emitter. The resonant tunneline transistor, demonstrated by Texas Instruments, is an intermediatelevel laboratory development. Further research will be required to develop a unipolar quantum transistor. A unipolar quantum transistor is said to be

necessary to replace current transistor devices, Reed said. SEVERAL OBSTACLES REMAIN. Since a number of significant vices can be manufactured. Reed predicted that the practical applications of this new technology are probably a decade or so away. The devices should arrive at about the same time that conventional integrated circuit technologies reach their abso-

LIMIT OF CURRENT TECHNOLOGIES NEAR. "The projected limit [of conventional technological is in the mid- to late 1990s," Reed said. "We can see the limit coming up. Before the year

2000, we will see the effects [of the technology's limitations] on "The unheralded heroes are

the guys who can bring these things to market," according to Reed. An accurate estimate of when the technology can actualbe manufactured is very difficult, although Reed predicted that the semiconductor devices should be available in the

> played from a palette of 16.7 ion colors, the company "These controllers should

Metheus' UGA 1128 graphics controller allows 256 colors to be displayed from a palette of 16.7 million colors.

## Metheus Adds Two Boards To Graphics Controller Line

Metheus Corp. recently added two new products, the UGA 1124 and UGA 1128, to its line of Ultra Graphics Accelerator

Both of Metheus' new graphtions, including enhanced drivics controllers feature 1,024-b ers for Autocad, Autoshade, Versacad, Generic CADD, Win-768 display resolution and highresolution VGA, EGA, and CGA emulation. The UGA 1124 offers four bit planes with 16 displayable colors from a palette of 4,096 while the UGA 1128 offers eight bit planes, allowing 256 colors to be dis-\$7 595

appeal to users of a broad spectrum of applications, from special graphics, CAD, and CAM to CAE applications, according to a company spokesman. The Metheus controllers support more than 100 applies-

dows, and GEM, the company UGA 1124 will retail for \$2,195 and the UGA 1128 will cost

Metheus Corp., OGC Science Park, 1600 N.W. Compt Drive, Beaverton, OR 97006-6905; (503) 690-1550, (800) 638-4387.

# Packard Bell Introduces Five Monitors

14-Inch PB 8530-MS Is Vendor's First Multifrequency Color Monitor

#### BY PATRICIA J. PANE

Packard Bell recently introduced five new monitors, cluding the company's first Itifrequency color monitor. The PB 8530-MS is a 14-inch diagonal multifrequency color monitor with a resolution of 720 by 480. It supports horizontal scanning frequencies from 15 kHz to 33 kHz and vertical frequencies from 57 hertz to 73 The monitor, which can be used with IBM XTs ATs and

hertz, the company said. compatibles as well as the IBM PS/2, displays 80 columns by 25 lines within a 9%-by-7%-inch screen area, Packard Bell said. The firm also released three VGA-compatible color moni-tors — the PB 854I-VG, the PB 8524-VG, and the PB 8531-VG



tor, the PB 8505-MG.

All three 14-inch color monitors feature a graphics resolution of 640 by 480 pixels, with the PB 8541-VG and PB 8524-VG offerine a text resolution of 720 by

Packard Bell's PB 8505-MG offers 720-by-400-pixel resolu tion for text and 640-by-480 resolution for graphics, the com-nany said. The 12-inch diagonal monitor provides high-resolution white-on-black display within a 8%-by-6%-inch area. Like the other monitors, the PB 8505-MG is mounted on a tilt-

400, the con

and-swivel base and has a compact design and small footprint. All five monitors are avail able now and are covered by a one-year warranty. The PB 8530-MS sells for \$769, the PB 8541-VG costs \$629, the PB 8524-VG is \$749, and the PB 8531-VG costs \$699. The PB

8505-MG is priced at \$299. Packard Bell, 9425 Car Ave., Chatsworth, CA 91311;

#### **Board Offers Choice of Configuration Options** Designed for Memory-Hogging Applications

BY RON COPELAND

Tecmar recently announced a 16-bit memory board that offers PC AT users a wide choice of memory configuration ontions. Designed for memory intensive software demands, the Classic-RAM board will be available in 2-messhyte, 4-messhyte, 6megabyte, and 8-megabyte configurations, according to

Tecmar, a division of Rexon Memory can be added in 512K or 2-megahyte incre-ments, using 256K or 1-mega-byte SIMMs. The board is compatible with the LIM 4.0 specification, LIM 3.2, EEMS, OS/2, Xenix, and Novell's

The Classic-RAM board is switchless, with memory config-uration accomplished via a software utility. Configuration parameters are then stored in an

on-board EEPROM. Through the software utility, memory can be configured in any combination of extended and/or expanded memory in 64K partitions, the company said. The board also permits AT memory to be backfilled. Bus speed is also user configurable, un to 12.5 MHz with selectable wait state operation. Classic-RAM's 16-bit EMS data trans-

fers should double throughput, according to the company Optional snap-in serial and narallel I/O modules will also be available. Classic-RAM

scheduled to be available this month. Price has not yet been determined Tecmar Inc., 6225 Cochran Road, Solon, OH 44139-3377; (216) 349-0600.

- Patricia J. Pane

Auto-T Plus Lets 4 Users Share Printer

#### Integrated Marketing Corp. is ground spooling using any avail-

shipping a low-cost, compact, automatic switch that lets four users share a printer.
The Auto-T Plus measures 8 by 4 inches and comes bundled performs bigh-speed back-

able memory. The product is available with serial or parallel available with serial or purallel ports and sells for \$195. Integrated Marketing Corp., 1031 E. Duane Ave., Suite H, Sunnyvale, CA 94086; (408) with Speedspool, the company's 730-1112, (800) 537-5999 memory-resident program that

#### Rodime Unveils 215-Megabyte Drive Internal Five-Disk Drive Has 18-Millisecond Average Seek Time

By PATRICIA J. PARE according to Rodime. The ary path the industry is on," Porter said. "It's a constant drives also feature automatic

Rodime Inc. has expanded its 3000 Series of 31/5-inch internal half-height drives with a 215-megabyte formatted drive, which it says is an industry first Available in on-board All ontroller or SCSI versions, the five-disk RO 3259 has an average seek time of 18 milliseconds and incorporates a "track-onthat yields 28 sectors per track,

head parking and a one-year Jim Porter, president of Disk Trends Inc., said that although

the 3259A and 3259S have the highest capacity announced to date, be expects to see more manufacturers following suit in 1989. In fact, he predicted IBM will introduce 300-megahyte drives by the middle of the year. "It's all part of the evolution-

struggle to keep up with the Rodime is scheduled to ship

the 3259S and 3259A in the first quarter of 1989. Pricing is estimated at less than \$1,000 in OFM quantities, according to a Rodime spokeswoman.

Rodime Inc., 851 Broken Sound Parkway N.W., Boca Raton, FL 33487; (407) 994-

#### **TECH TALK • BY STEVE GIBSON**

# There Isn't Much Left of My Good Old IBM PC XT System

Yesterday morning I brought my "PC at bome" to the office. As I leaned over it, disconnecting its myriad cords, cables and wires, I was struck by the sight of the little square metal tag in the upper corner of its back panel. The tag read: IBM 5160. I wondered briefly bow that old IBM

machine might have felt if it could have ood my wry chuckle at seei ame. I remembered, not for the first that there wasn't really much "IBM" left inside that poor old shell. Back when IBM made us that great offer of buying back our obsolete machines as trade-ins on shiny new PS/2s, I bad

briefly considered the possibility.

First I would have had to restore the XT's original power supply, which had been outgrown years ago. The XT's original 4.77-MHz motherboard bad en shelved in favor of a lovely 12.5-MHz, zero-wait-state Bullet 286. The machine's single full-beight 360K floppy drive had been replaced by two halfbeight drives, one for 360K and 1.2megabyte floppies, the other for 720K. and 1.44 megabytes. The original floppy controller bit the dust along the way. Since the machine's factory 6:1 into leave, slow 10-megabyte drive couldn't hold my growing collection of software, it was replaced by a pair of cute little Fuji 30-megabyte RLL drives. The origin XT hard disk controller sat next to its 10mesabyte drive: the slot it had vacated w bore a 2:1 interleave Adaptec 2072 8-bit RLL hard disk controller. I don't know what became of the machine's original CGA display adapter. As I lifted the disconnected machine

up to the table top, I noticed bow strong and sturdy that original IBM case was. It was then that I realized that IBM really does make a great box.

STIFLING INNOVATION. So the new year is upon us. As I glance around Gibson Research, counting our 12 networked IBM-compatible PCs. I'm worried about the future. My company, and the industry in general, depends upon the rights of companies to freely build upon the technological foundations established by others. "Standing upon the shoulders of ants." as it were.

History repeatedly demonstrates the on whereby firms that were nce small and innovative become large, stodgy, and unimaginative. This means that the future belongs exclusively to small upstart firms that can pick up where the prior generation of standard-setters proe left off. Unhappily, the nterests of the large and stodgy firms are best served by the maintenance of a status guo. These firms must literally stifle tion to survive

Every major issue currently us angry litigation will affect us profoundly. Take my own company as an example.

The machines we use all have sic" ISA (industry-standard architecture) buses. With the new first-party DMA SCSI controllers, which are easily capable of moving 10 megabytes per second over medium-speed ISA buses, you can't tell me that I need an expensive and propri-

Steve Gibson is the developer and publisher of Spin Rite and president of bson Research Corp. of Irvine. California. The views expressed are his own.

from an IBM licensee. Most-frightening is the lightly veiled threat we're still hearing from IBM about license fees on old ISA and icon-driven computing

bus machines! My company is also swinging heavily toward Microsoft Windows to solve the word processing and spreadsheet needs of our less computer-savvy employees. Nothing else but Windows supports the Apple's sword of Damocles hanging over our heads, threatening to cut PC users off from access to bit-mapped WYSIWYG

After implementing a com Novell network, we adapted our internally written order-entry and in-house management system to run multiuser. Wanting quick development and quick

ware's excellent Foxbase+/LAN data base system. As you've probably heard, if Ashton-Tate had its way, we wouldn't have this excellent solution from Fox, rather we'd be stuck using something

disappointing from Ashton-To 1989 will likely go down in history as a pivotal year during which these funda mental issues will finally begin to be resolved. I'm keeping my fingers cross and rooting for the little guys.



#### THE TECHNOLOGY FACTORY

#### Presents

# Storage Solutions from the first name in disc drives

If you're looking to add hard disc storage to your new or existing personal computer, we've got a Seagate drive for you.

in 1980, Seagate has manufactured more small disc drives for PCs than any other company in the world. And now, with many different 3 models to choose from, there's a Seagate drive that's right for your capacity

and performance needs.

Seagate ensures the quality and relia-

bility of its drives by designing and manufacturing many of the drives major components, including disc media. Inner viole-coil actuators and stepper motors. We also carry Seagate's own line of disc controllers, which optimize the drive's performance in a wide variety of computer systems.

No matter which Seagate disc drive or controller you choose, you'll find the same high quality workmanship that has made Seagate the first name in disc drives worldwide.





# **MACINTOSH NEWS**



Hyperworks Organizer uses a loose-leaf binder metaphor to help users manage their schedules, tasks, and expenses.

## Hyperworks Organizer Tracks Time, Expenses

Timeworks Inc. recently intro weights and measures, toil-free duced a series of interconnected numbers, and air and road Hypercard stacks that bein users manage and control time, tasks, organizing miscellaneous per-The \$99.95 Hyperworks Orsonal data, such as auto expenses, daily reminder, travel

ganizer is designed around a three-ring loose-leaf binder ootebook metaphor that is di vided into six sections. section keeps track of appointments, transfers followup actions to Hyperworks calendars, dials the phone and logs the charges, and transfers information directly into word pro-

hat" tracks and update all aspects of a project, such as task delegation, costs incurred, progress toward goals, and pro-jected starting and coding dates. The "What" section includes daily, monthly, and yearly cal-

endars that are automatically updated as users' activities "How Much?" tracks expenses, which can be sorted and viewed by category, account, or project, as well as totaled and flagged as either a business or personal expense, according to

Mac Quickletter Program Designed To Handle Letter Writing, Envelopes

Working Software Inc. this month released Quickletter, a combination desk accessory and application for people who use rir desktop computer for cor-

Ouickletter includes a builtin address book, auto-defined read-only stationery with pic-ture letterhead, and vertical centering, according to company marketing coordinator Mark Galvin. He said the program provides for automatic envelope printing, page preview, and mul**Businesses Turning to Courseware** Systems Used for Development of Presentation, Training Materials

system itself runs only on th

Future plans for enhance

the program include adding co

or and, in the long-term, artifi-

BY LAURIE PLYNN

MINNEAPOLIS - Course ware authoring systems, such as Authorware's Course of Action, have made their way into mainstream business use for the development of presentations and training materials, accord-ing to the publishers of these

Authorware president as thief executive officer Bud Colliean estimated that about 40 percent of the users of the Course of Action system are in sesses, and he expects that number to increase to 70 percent in the near future Telerobotics of Knoxville.

ennessee, which offers the Course Builder development system, said that its program is in use at over 300 businesses for presentations. Both courseware rograms share the market with Apple Computer's Hypercard which is also targeted at both business users and education

"One of the reasons that it's rowing so fast is that the cost to usinesses of uninformed em-Authorware chairman Michael

sllow the program to actually "learn" from the user, the com-Course of Action has been on any said. Telerobotics has ann the market for the Macintosh since early 1988. Authorware is now offering a conversion pro-

hancements to its Course gram that will transfer course-Builder software that include ware written in Course of Action color and a Hypercard browser function. "The impact of color on the Macintosh to run under an IBM PC, a move that the in courseware. company bopes will improve its software, and sales presentations is hard to overstate," said H. ion into the installed base but at the same time belg sell Macintoshes. The authoring Lee Martin, president of

The new version of Cours Macintosh, according to the Builder, which is called 3.1, also permits users to import materi als from other programs into courseware developed in Course Builder, according to the cial intelligence features that will



Authorware inc.'s Course of Action authoring system permits users to easily create simulation models that lockude animation.

#### National Instruments Releases Mac **Data Acquisition. Control Products**

Several data acquisition and control products for the Macintosh SE and Macintosh II. including a Hypercard tool, have

The "Data" section include

Timeworks Inc., 444 Lake Cook Road, Deerfield, IL 60015; (312) 948-9200.

plans, and ideas

BY PAULA S. STONE

iotes" is a notebook for

een introduced by National nts Corp. Hyper-488, which comes standard with the company's strument control boards, uses Hypercard stacks and a

Quickletter also includes a spell-

either an application or a desk

sor, but is designed specifically

for correspondence, according

Working Software Inc., 740 Front St., No. 318A, Santa

Cruz, CA 95060; (408) 423-

- Jeff Angus

to Working Software.

Quickletter is not intended to

lace a general word proces-

ing checker. The program, which has a list ion of \$124,95, can be used as

Hypertalk language interface to IEEE-488 (GPIB) instrument

The program includes tools at manipulate and format data for other programs that handle data analysis and presentation and management requirem like National Instruments' Lab view program. Other tools per form boolean operations and

control applications

Hyper-488 is shipping no with prices beginning at \$495. The company also now offers a new series of multifunction analog, digital, and timing in-

put-output boards for the Mac SE and Mac II. The Lab-SE plug-in board has an 8-bit analog-to-digital converter with eight analog inputs. The Lab-SE driver controls the data acquisition function on the Lab-SE interce. The Lab-SE board cor

\$595, and the driver costs \$95. The new NB-MIO-16X board for the Mac II has 16 analog-input channels and offers 16.Nt digital resolution The board is scheduled to ship in February with prices beginning at \$1,695. The NB Labdriver is available separately for \$295. Labview costs \$1,995. National Instruments Com-

12109 Technology Blvd., Austin. TX 78727; (512) 250-9119.

## SPSS to Unveil Mac Version Of Its Statistical Software

SPSS Inc. recently a

plans to bring out a Macintosh version of its statistical soft in mid-1989 SPSS said it has signed an reement with Management Computer International AB of

Stockholm, Sweden, to jointly develop the statistical data anal ysis package for the Macintosh Il and SE computers. The package will contain the full functionality of SPSS mainframe statistical products and will bave a Macintosh user erface, the company said.
"In the past year we have

seen a growing demand for SPSS products on the Macintosh said Norman H. Nie, chairman and cofounder of SPSS Inc SPSS is already available on mainframes and IBM PC's Management Computer International will work closely with Datalogen AB of Uppsa Sweden, io development of the user interface. Datalogen is a leading Scandinavian company for Ma cintosh training, according to Bo Jansson, Management

SPSS had to trim some of the ore advanced functions out of its DOS-based product due to the 640K memory barrier. "We won't have to do that with our Macintosh product," said Lou-ise Rehling, SPSS' senior vice president of product development. The advanced functions are primarily in advanced file and data management capa ties she said

SPSS is working on the Mac intosh version in conjuncti with its OS/2 Presentation Manager program, which will have a similar user interface. SPSS Inc., 444 N. Michi Ave., Chicago, IL 60611; (312) 329-2400.



# When our engineers developed the first 2 MB

Unmowed lawns. Overgrown gardens. And unpainted fences. It wasn't pretty. But, being the first company in the world to introduce the 2 megabyte diskette was worth it. According to our engineers.

Six years and many, many

weekends of hard work finally paid off. In March, 1987, history was made. We introduced a 3.5 inch diskette that could hold twice as much

information as any other diskette for specific systems.

Its performance redefined



# diskette, major projects had to be put on hold.

the word precision. Its reliability and durability were legend.

In short, it was the ultimate 3.5 inch diskette. But that still wasn't good enough.

That's why to this day, our engineers are still hard at work. On diskettes. Data cartridges. And other forms of magnetic media. Every day. Every weekend. Trying to improve. Reinvent. And make history all over again. So, until then, you'll just have to settle for

So, until then, you'll just have to settle for state of the art.

And hope you're not one of their neighbors. For more information, call 1-800-888-1889, and ask for Extension 75.



## **UNIX NEWS**

FX-Mail will also support a

# E-Mail Utilities Bundled in One Package

FX-Mail Gives Full-Screen Interface to Incoming and Outgoing E-Mail on-screen command defaults are

#### BY MARTIN MARSHALL

Several utilities that enhance the sending and receiving of electronic mail through a Unixbased system have been bundled into a new package, called FX-Mail, out out by RSX Tochnical Services, in Washington

FX-Mail gives a screen orientation to both incoming and outgoing E-Mail, providing the user with a complete listing of pending incoming messages at a glance and also allowing users to use the system's full-screen vi editor to create outgoing mail. Context-sensitive help and

#### C-to-Postscript Translator for News Developed BY MARTIN MARSHALL

There are far more C-language programmers than there are Postscript-language programmers, yet developing applications for Sun's News Windowing environment has required that programmers be familiar with both languages. The Postscript obstacle can now be over come through the use of a new nackage that translates code om C into Postscript before

Called C2PS, the translating piler lets the programs op both his application and ical interface entirely in C puage code, according to slisher Unipress Software Normally, the graphical erface portion of the program would have to be written in

"Most C programmers today are not conversant with Postscript," said Unipress president Mark Krieger, "It can be very difficult for programmers to learn. This program will elimite that pain. When used in conjunction

with the Unipress Emacs editor, written by MIT's Richard Stallin, the user can edit and view code in one window while viewing the produced Postscript code in a second window. The phic output can then be own in a News window or on a

Postscript-compatible printer. C2PS is available on Sun workstations and DEC VAX ems. Its binary code version is priced at \$2,995, and its source code version is priced at \$14,995. University prices are \$995 for binary code and \$4,995 for source code. All versions are available now. Unipress Software Inc., 2025 scoln Highway, Edison, NJ also features of FX-Mail, as are support for nested, systemwide, and personal aliases and distribution lists. It also allows standard noth-alias data files. The utility lets the user include ASCII files and, in most implementations, multiple incoming messages as part of the text of outgoing mail. It also supports a display pager, so the user can page forward or back-

ward through the text of a There are also provisions for the recovery of deleted mail, as FX-Mail enables users to access the "delete" mailbox on the

If the user wants to use his own text editor rather than the stem's vi editor, FX-Mail will also support as an alternative editor any program that saves its files in ASCII format and is callable in the form "program

"This program does not require the user to disable any of is existing E-Mail facilities. like /bin/mail or mailx," according to FX-Mail creator Raymond Schwake. "It works with those programs as required, writing to the same addresses and following the same locking conven-

The product includes an alternate version of rmail which is used to replace /bin/mail when the user wishes to support remote aliasing, he said.

direct print facility using the system's default lp printer, and it will support multiple mailboxes. including the provision to change current mailboxes on the fly. It will also support direct shell-level posting of ASCII text

We've added a great deal of functionality, but this does not mean that the system will now require a full-time system administrator," said Schwake. "The intent is to provide a system that can be supported even by the moderately skilled

Once installed, most administrative responsibilities will center on maintaining the UUCP link to remote site: The 286-based version of FX-Mail is priced at \$89, while the 386-based version is \$149. The Unix/286 version runs un der Microport V/AT and

AT&T's Simultask for the PC 6300+. The Unix/386 implementation runs under Xen 386, Interactive 386/ix. AT&T Simultask, and Microport V 386. Both versions are available immediately. Releases for the Altos 3068 and ATAT 3B2 will be available at the end of January. Through February 15, RSX will offer a \$20 introduc-

RSX Technical Services, Veazey Terrace N.W. Suite 712, Washington, D.C. 20008; (202) 362-3094.

# Sun River Sells Monitorless Fiber-Optic Configuration

#### BY MARTIN MARSHALL

In a move aimed at lowering the overall cost of remote bitmapped terminals on multiuser systems. Sun River Corp. recently unbundled the monitor from its line of fiber-optic stans, selling the monitorless configurations at a substantially

"By providing a monitorly configuration, we allow endusers and VARs more product and price flexibility for matching their hardware to applications like computer aided design and desktop publishing," said John Gully, Sun River's director

Without the monitors, the list price of the Sun River fibertic stations is reduced to \$999 for Hercules compatible mo chrome, \$1,299 for EGA. \$1,499 for EGA+, and \$1,699 for VGA versions. This compares to the previous pricing with a monitor of \$1,399 for

onochrome, \$1,999 for EGA, \$2,299 for EGA+, and \$2,495 for the VGA station.

All versions use a fiber-optic link to establish 32-mbps data communications with the host The fiber-optic links are up to 1,000 feet long and plug into a multiport board that, in turn,

plugs into the AT bus of the host Special drivers are required to access the bit-mapped capabilities of the Sun River terminals, but those drivers have now been written into the current

versions of a number of multiuser operating systems. drivers now exist for SCO's Xenix, Version 2.3; Interactive Systems 386/ix, Version 2.0; Digital Research's Concurrent DOS 386/MGE; Virtual Sys tems Quick Connect; and IGC's VM/386

Sun River Corp., 108 Busi ss Park Drive Jackson MS 32913; (601) 957-0100.



### **Unix Intruder Caught** By Lawrence Officials

edly broken through the network security at Lawrence Livermore National Laboratories has been detected and con-tacted by LLNL officials. The vulnerability of Unix networks to unauthorized intrusions has become a serious concern at the federal level

where a number of agencies are trying to standardize upon the use of Unix-based networks. The concern has prompted the establishment of a national crisis center for network break-inc called the Computer Emergency Response Team. (See "Virus Control Center Is Proposed,

December 12, 1988, Page 8.) According to an LLNL document obtained by InfoWorld the most recent LLNL intruder gained access to the system by way of Internet computers at the University of Washington and Stanford University. Because of the remote accessibility of these computers through the Internet however, it is possible that these

computers were not the point of Once the intruder gained access to the LLNL computers, he achieved "superuser" status, which permitted access to every nonclassified file at LLNL, the

document states This opportunity could have resulted in widespread destruction of unclassified data, but no files are known to have been damaged nr destroyed, according to LLNL officials. The intruder used a "crack-

er's dictionary" to obtain a small list of old and existing passwords, the document states He also created the capability to reenter the system by giving himself an account number and his own password to make it appear that he was a legitimate

A remote caller who had repeat-'Our security people have been in touch with the intruder. and we have been assured that there will be no further intrusions from that source," said Ron Teunis, an LLNL spokesman Tennis also said the matter had been turned over to the FBI for further investigation, and the intruder could be prosecuted for foderal computer security laws

Officials at LLNL said that fixes have been created to guard against the particular methods used in the December 3 to 10 Chuck Cole, LLNL's con

puter security manager, said that "the software fixes being put into place are not going to solve every problem. There may be vulnerabilities in Unix that we still dnn't know about FBI spokesman John Holford confirmed that a sing suspect has been identified, that no arrest warrants had yet been issued, and that the investiga-

tion continues. "Right now, we believe there was only one per-son involved, and that all of the break-ins are linked to this person," Hulfurd said. The intruder had broken into the unclassified portion of LLNL's node of the Internet

system on at least 10 occasio between December 3 and 10, according to a document released by LLNL. The intruder exploited one of the known weaknesses in the Unix systems running on many of LLNL's computers, according to an LLNL document. LLNL's Cole recommended

using passwords that contain the characters #, \*, and S, all of which help to foil the cracker's dictionary.

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## INDUSTRY

### **Torresi Sets** Sights on Networking Solutions

SUNNYVALE, CA - Businessland cofounder Enzo Torresi - often an outspoken critic of PC vendors - has resigned his post to become president and CEO of Netframe.

a network server company. Netframe has a lot of the technical pieces together, and it was time for them to get a fulltime CEO and president," said Torresi. With product release about nine months away, it was a good time for Torresi to get involved with the new venture "This is a great opportunity for me," he added.

Netframe, founded in 1987, is developing a network server using its own chip sets and 80386 microprocessors. The Netframe product promises to bring mainframe power to desktop computers and is due to ship in the summer of 1989. Torresi cofounded Busin land in 1982. In its six years of operation, the cor grew to more than \$870 million

in sales with more than 40 stores

Databases/DOS

Product

2 Dhase III Ples 1.1

6 PFS Professional File

9 Datacase Rol. 3, Vor. 2.5

3 Feshese + 2.1

I Diasa IV

d Paradox

7 Reflex

8 Rhase 2.1

10 PCFHe+ 2.0

Graphics/DOS

**Harvard Graphics** 

Pagemaker 3.0

Graphwriter II

6 Flow Charting II+

8 PFS First Publisher

10 Windows Graph Plus

9 Designer 1.3

7 GEM/3 Draw Ples 2.0

4 GEM/3 Presentation Team

Product

2 Freelance+

Q8A 3.0

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Businessland cofounder Enzo Torresi has left the company to become president of Netframe.

It was in part the very success of Businessland that prompted Torresi's move. "The company has different problems today than a year ago," he said. "At \$1 hillion it has entered into a new

As president of Netframe, Torresi will primarily direct the sales and marketing of the network server product. While no agreements have been inked, Torresi said Businessland might carry Netframe servers. works and communications have been a key differentiation and strategy in Businessland's last three or four years," be said. They have the capability to

carry the Netframe server." Although Torresi is resig as vice president of U.S. sales, he will retain his posi Businessland's board.

Vendor

Borland

Bortend

Microrim

Lotus

Aldus

Letus

Patton

Micrografi

Micrografix

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Ashton-Tate

Fox Software

Software Publishing

Dataease international

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Digital Research

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Software Publishing

#### Apple Hopes to Increase **Education Market Share**

Gifford Named Vice President of Education

BY LAURSE FLYNN CUPERTINO, CA - Apple Computer's recent appointment of a vice president of education reflects the company's commit-

ment to the higher education market as it prepares for the new year and the changing face of the hisher education market. Apple named Bernard R. Gifford, dean of the Graduate School of Education at the

University of California at Berkeley, to become its vice president of education in February. Gifford was dran of the

Laticorp Files for Bankruptcy, Sells Off Its Products

BY PAULA S. STONE SAN FRANCISCO - Laticorp. publishers of the information

management software, has filed for Chapter 7 bankruptcy and is selling off its products The privately held company decided to declare bankruptor and liquidate its business in mid-November, after its chief investor, Berg & Berg Developers of Cupertino, California, decided to stop funding Laticorp, according to former Laticorp president William F.

Boehlke. Laticorp products include the Textbase, Version 1.2 knowledge access software, Latitude groupware word processor with spreadsheet software, and Sync appointment calendar and

oup scheduler with electronic Boehlke said that more than 25,000 copies of Laticorp prod-

ucts have been distributed worldwide, supporting an estimated 75,000 users. The company bas sold

Textbase to Fulcrum Technologies Inc., an Ottawa, Canadabased developer that designed the core to Textbase. Fulcrum will rename Text-

base to Fulcrum Ful/Text and replace current copies with the Fulcrum-labeled product, said Peter Eddison, director of marketing for Fulcrum. The company will soon release its user-support plan that includes

provisions for product upgrades. Sync and Latitude are still available, according to Boehlke.

Support for current users is being determined, he said. Fulcrum Technologies Inc., 560 Rochester St., Ottawa, Can-ada K1F 5K2; (613) 238-1761.

school for six years. Prior to that, he served as deputy chancellor and chief business affairs officer for the New York City

The appointment comes as Apple prepares to compete with Next Inc. and Sun Microsystems, both of which are expected to introduce machines aimed at higher education institutions. By Apple's own figures -

figures with which many observers agree - the company holds about 35 percent to 40 percent of the education market, generating more than one-third of Apple's annual revenues. In the next few years. Apple hopes to continue to increase its penetration into higher educa-tion. Currently, for example,

computer use among students in universities remains relatively low, according to Apple. 'At Apple, education is much more than a vital part of our business. It is, in fact, the foundation of Apple's efforts to empower individuals with new and creative ways to learn," said

Allan Z. Loren, president of Apple U.S.A. Gifford's appoints lows the resignation of Apple's ainst competitors such as

ming interfaces for Mac workstations. The system allows teachers to write courseware in a fraction of the time traditionally

Course of Action.



Bernard Gifford to lead its higher education efforts. Jobn "Bud" Colligan, who spent five years leading Apple's education sales forces. Colligan left in

December to become president

and CEO of Authorware, the Minneapolis-based publisher of

The Course of Action course-

ware authoring system provides

an object-oriented program-

The Course of Action courseware and other similar programs - which to some degree includes Apple's Hypercard - belp give Apple a hedge at's Nextstep interface.

#### #END-OF-YEAR INDEX

key education represe

OS/2 developers kits shipped — 5,000
 Number of OS/2 applications announced in 1988 — 800
 Number of OS/2 applications scheduled to ship by

the fourth quarter - 532 Total PCs sold in stores — 2,160,612

Macs sold retail — 270,411

 Micro Channel PS/2s sold retail — 425.935 Standard PC retail sales — 1.355.688 Laptops and portables sold — 207,785

Total value of DRAM chip sales, worldwide — \$5.7

Total value of all chip sales, worldwide — \$45 billion

Highest gray market chip price for 256K DRAMs — \$15

 Lowest contract price for chip — \$3.50 Publishers who've announced OS/2 products — 200 Publishers who've announced DOS products — 2,320

 Windows sales for 1988 — 1 million Windows applications released in 1988 — 48
 Value of all DOS applications sold through September, 1988 —

\$2.2 billio · Value of all Mac applications through September, 1988 -\$302.3 million

 Value of other software entegories, including Apple II, Commodore, CP/M - \$360.5 million

 Number of hardware vendors shipping OS/2 — 14 Number of hardware OEMs licensing OS/2 — 55
 Typical street price for Lotus 1-2-3 — \$269 • Retail price for Lotus 1-2-3 - \$495

While final figures for several categories, including software and hardware retail sales, were not available by the end of the year, most vendors were expecting 1988 to show strong gains over 1987. Data for this Index was provided by IBM, Microsoft, Storeboard, Dataquest, the Semiconductor Industry Association,

#### NFOWORLD



#### STATE OF THE INDUSTRY . BY RACHEL PARKER

# After Little Restraint in 1988, Some Resolutions Are in Order

New Year's resolutions are the byproducts of taking as sober look at indorunken extravaganor, voosing not indrunken extravaganor, voosing not inmake the same mistaken again. In that industry is living to the consequences of "sugroingle to include the consequences of "sugrotion of the consequences of "sugrosion of the consequences of the consequences of "sugrosion of the consequences of the

vein, and without the hangurer, the PC industry is invited to consider the following suggestions.

1. Advertise no product before its time. Paul Masson may have said it years ago, but it has quite a bit of currency. 1938 got started with Ann Arbor Software the said of t

time. Paul Masson may have said it years ago, but it has quite a bit of curror ago, but it has quite a bit of curror 1988 got started with Ann Arbor Softweet's solveitsing and beavily promount had missed its 1987 slip dates and was rumored to be nowhere close to slipping. Now, informit has accepted the burdon of the prevelesse advertising mantle, promoting its Wingz Maicrintosh spreadsect — despite missing its ship dates.

mona—exper mosting its stills paides. These promotions certainly keep the leasted products, but they also unfairly cart a cloud of uncertainty over the market. Photoials Dayers wonder: Should we buy Product; I which it is available today, or wait for Product 2, which is said today, or wait for Product 2, which is said today, or wait for Product 2, which is said today, or wait for Product 2, which is said today, or wait for the better product, rather than regert an investment in both software and training? I have been product that the place? Who wouldn't toy to wait for the better product, rather than regert an investment in both software and training? I have been product that the product was all the place? Who mouth that the product was the product wait of the product wait in it. 2. Announce no product until it is 2. Announce no product until it is a product wait in it.

ready to ship — or close enough that you don't have to announce delays. Lotus preamouncement of 1-2-3, Release 3.0 obviously bactfired, but it is not alone in obviously bactfired, but it is not alone in yo, While it appears self-serving for Lotus Jim Mansi to now proclaim a fully man on the product announcement, it also most served by assumementement, but the content of the product announcing products can embitter users. Pits, in the case of Lotus, the public has been embirated and the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products that turn out to be hollow, and presiment of the products and the pro

3. Limit strategic partnerships to those that have specific announcements. Author-Tax Microsoft, Borinda, Symantea, and Werd Perfect have this year trooped around the country to strategic press conferences, waved flags supporting a new environment, but stopped short of announcing any product. The developers would be better served if they selected partners with real products, not just the mend strength of 5 million installed prepatibles.

4. Control the nasty factor. We saw a resurgence of is in the political campaigns this year and, unfortunately, PC CEOs picked up the habit. At conference, seminars, and press conferences, Oracle's president Larry Ellison could not resist president Larry Ellison could not resist Every time a Unix proponent advanced in interface, Microsoft's Bill Gastes said such efforts were a waste of time. Users and the industry benefit from

having choices. Obviously, Oracle's Ellison believes that his SQL solution is better than SQL Server. Give us some reasons for the user to choose one over the other, not partially true attacks. 5. Deal responsibly with the virus

Rechel Parker is the Senior Editor of InfoWorld's Industry section.

problem — don't hide from it or sensitionalize its threat. When a computer student's virus hit the Arpanet system in October, opportunistic providers of a variety of virus detectors, preventers, and disablers predicted all sorts of dire consequences of "suprotected" computing, it is not enough to hope that the fear monogers will go away. Respublish commonogers will go away. Respublish commonogers will go away. Respublish comand valid responses to computer viruses.

ase and refinin from perpetuating the image of the rospic computer, gone beened by a confusion of the rospic confusion of the

ance is for their customers before jumping at the invitation. And CEOs who rail against competitors should add substantive comments about different products. While we miss the color of the early days in the PC industry, marketers and CEOs need to distinguish flamboyance from unfair competition and mean spirit-oness. With restraint and determination, maybe next year we will have more new, interesting reducts to write advocates to write advocate to wr

# FLEXSCAN 9070S, PC Hi-Res That Looks Like a Million.

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The FLEXSCAN 9070 provides a 16-inch screen, large enough for CAD/CAE and 3-D projections, yet small anough to fit comfortably into your home work space.





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- Apple Mar. II and Supervisic spectrum compatible
   Max. 1290 dots × 800 lines high resolution
- 1024 date × 768 lines display on Non-interlece signal delivers facker-free tech-ses graphics
- 20kHz to 50kHz horizontal scan sutematic adjustment 50Hz to 80Hz vertical scan automatic adjustment
- sutometic adjustment
   16 inch, 0.3 from dot pitch and newly developed XF/Extended Field) Gun to
- obtain both brightness and sharp focus

  Front mounted controls including the input
  signal select switch between 2 video input.
- Selecting white or Amber displays colored application in shades of gray or amber
   Titl-Swivel stand standard

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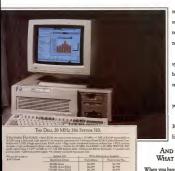


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during the year:

#### TECH STREET . By John GANTZ

### A Whimsical Look at the Industry Headlines Expected in '89

for the obligatory end of the decade. Let's do something different this year. Let's put some sport into 1989's predictions, iodulee in a little fiction, and report

After all, it's the em as if they were oews. Here are four headlines that would be interesting to see

SUN MICROSYSTEMS REPORTS QUARTERLY LOSS. Wall Street analysts were uniformly surprised at Suo's recent report of a quarterly loss. Apparently both the market and Sun were unprepared for the sudden saturation of the Sun workstation market and the erosion of margins from offshore competition. Analysts have low-ered their earnings estimates, and the consensus oo the Street is that Sun's

ohlems are far from temporary. As one

analyst said, "This is a company that knows how to grow at 100 percent a year, oot at 5 percent. For years, Sun was production-limited, now it will have to learn marketing and sales. It's a tough

SIAGATE BUYS CONTROL DATA. Scagate surprised the industry by outhidding Uoisys for the husk that remaios of

Control Data, ooce a major force in

WORL

computing. In retrospect, the purchase makes sense since CDC was a major OFM provider of mainframe and minicomputer peripherals and Seagate is a major provider of PC peripherals. Although Sengate sees the acquisition as a way to increase its price per unit and fend off low-ball competition for PC peripherals, cynics see it as a desperation move.

OLSEN MOVES TO TANTE, APPLE BUYS DEC AS WHITE EMBERT. The surprise departure of Ken Olsen, founder, chairman, and guiding light of Digital Equipment Corp., to take up painting oo the Pacific isle of Tahiti threw the company into a bizarre takcover situation that only an 11th hour bid by Apple could untangle. As mentiooed io articles over the last several mooths. DEC's stock slide had continued on news of drops in large VAX sales and delays in several high-end replacement

VAXes, as well as the collapse of the Open Software Foundation Although DEC was still reporting positive operatiog iocome, extraordinary loss carryforwards related to the writedown of assets acquired from Trilogy

several years ago had put the company into red ink. Olseo's move sent the stock into a further tailspin as institutional investors unloaded in a single-company version of the crash of October 19, 1987 When the stock moved under book value, Solomoo Brothers, acting as an agent for an unknown company that many suspect is AT&T, made a tender offer to stockholders at \$53 a share Management for Digital, hit with the

double whammy of Olsen's departure and the prospect of a hostile takeover, hired First Boston to fend off takeover. At the same time, John Sculley, with the help of West Coast venture capitalists Bill Hambrecht and Art Rock, put together a financing package that allowed Apple Computer to up the Solomon Brothers bid to \$68 a share in cash and Apple stock. A bidding match ensued, and when it was all over, Apple came out the winner oo a hid of \$81 a share and Apple stock.

Whether Apple bought a pig in a poke or got the deal of the century will be debated for years to come, but now there's oo dispute over which computer company is No. 2.

COVERHMENT BANS INTEL 80486 CHIP. In a surprise joiot decision by the Department of Defense and the General Services Agency, U.S. government purchasers are embargoed from huying any computer or electronics products with embedded 80486s. The reason has to do with intermittent "soft" failures of the chips as a result of electromagnetic emissions from materials used in fabricating the chip and the chip carries

While Intel ootes that all chips suffer a certain amount of spurious failures as the result of radiation emissions, DOD officials said the 486, complex and designed to extra tight tolerances, is especially susceptible. The DOD is sensitive to the cost - and io some cases impossibility -

of recalling embedded chips.
So what do you think? Could any of these come true? John Gentz is editor of the Tech Street Journel, a newsletter on the high-tech stock market and business performance. The views expressed are his

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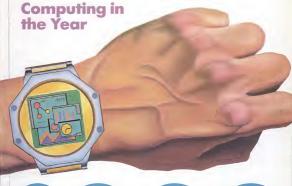


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# **PERSPECTIVES**



# 2000

## BY THE INFOWORLD STAFF

The alarm goes off at 6 a.m. At 6:15, the coffeemaker starts percolating, and at 6:30 the laws spraklers go on for exactly 10 minutes— aid of which was commuted by your computer and programmed the night before. You shower, get dressed, palp down a cap of coffee, and are in your office at 7. ready for the teleconference with the Lendon, New York, and Sun Francisco offices on

with the London, New York, and San Francisco offices on the latest sales report. Before leaving the house, you call up the local grocery store on your comparer and, using your touch-screen display, order enough groceries to get you through the weekend.

won't leave their homes to go to work), just as individuals' routines vary today. But the underlying theme will be the same: Computer technology will be uncorporated into all aspects of our lives.

This, at least, is the consensus of several leading players in the PC industry as well as a few "futurists" who, unlike the rest of us, spend the better part of their

players in the PC industry as well as a rew "ruturists" who, unlike the rest of us, spend the better part of their days considering what the world of tomorrow will look like. Technology changes at such a rapid pace that

predicting what may be possible — let alone popular even one year out is difficult at best. We backed the odds, though, and put the predictive powers of leading industry figures to the test, asking them to give us their vision of what computing will be like in the year 2000. Remarkably, many of the people we spoke with touched on similar themes. Voice recognition, the

solution of similars tenents. Your recognition, in work and home life, and the corresponding social implication came up in many of our discussions. And although many people we spoke with concentrated on what we'll be able to do with the computer of the future, an equal number were concerned not so much about what we'd do with the technology as what it would look like.

technology as what it would fook like.

Some people declined to even venture a guess on what computing would be like in the year 2000 (figuring it was so far out that nothing could come close to being right).

so far out that nothing could come close to being right).

Replaciburly only comment was, "God knows where computers are going to be. If we all could come back every 40 years, it would be fascinating."

A few of the people we spoke with, however, focused

on what will be the same in the year 2000 rather than how different computing will be. Heids Roizen, president of T/Maker Co., believes thangs won't be all that different than they are right now. "When you look at the average user, a lot of what [they] do with computers will be the same. Spreadsheets, word processing, and databases are

reparent systems. Networks will dominate, said Doug

d same. Spreadsheets, word processing, and databases are still going to be in the mainstream."

Roisen isn't alone in her thinking. When discussing the future of computing, many people talked about more of the same — more canobilities and more power in more of the same — more canobilities and more to were in more

INFOWORLD

# PAGE 38 ISAAC ASIMOV Science fiction writer

m not sure how for it will go in 10 years, but increasingly it will be possible for people to check on the office from their home, to receive messages onywhere, to transmit messages from anywhere, even to



meet with people 'foce to face' by means of television conference phones. So, in general, there could be a decentralization of society. People won't have to con glomerose themselves in offices and factories and they could do much more of their work from home. I don't foresee it ftechnologyl being dehumanizing or anything like that it's just the reverse. I think

the computer is o great humanizing factor because it makes the individual more important. The more information we have on each individual, the more each



individual counts '

NICHOLAS NEGROPONTE Founding director of The Medie Lab, Massachusetts Institute of Technology.

ots of people are making ond describing the kinds of computers that will look like notepads. That's a commonly accepted meta phor for the future. I think probably the more prevalent metophor will be quite different. Computers will be smaller than golf balls.

They'll have that form factor - not necessarily spheres, but they could be culflinks. They could be God knows what. But they'll be very small objects, for which most of the interaction is [vio] speech, vs. poper-sized objects; for which most of the interaction is grophics and stylus-type communications. I see na reason why outers need to be any bigger than your thumb. That's really the form factor of the future."



WAYNE BATLIFF Developer of Dbase and Emerald Ray. Computers will take con-trol of houses: they'll

control burglar alarms, entry lighting, energy conservation, and sown watering. They'll keep track of lists of things that need to be done, [such as] required mointenance and when to point. They'll tell you if there's a leak in the roof. And they'll take over functions in the car, providing warning systems - like telling you if you're on a collision course or that there's a curve up ahead and you're go-



IFAN-LOUIS GASSEE

inch index cord - and

all of them."

you'll be able to write on

THEFT

President of Apple products, Apple Computer Inc.; charged with taking Apple into the "second ege of personal computing."

omputers might not be intelligent by then, but they will surely be more magical — more personal, more personable, more ubiquitous. That is, they will assume a much broader range of shapes - onything from o note-



BOB METCALFE

Vice president end general manager of the distribu systems division of 3Com Corp., 3Com founder, and inventor of Ethernet.

orecasters tend to overestimate the short-term changes and underestimate the long-term changes that technology will give us. 2000 is 11 years oway. Eleven years ago. I was working at Xerox PARC, using o Stor with o grophical interface, a mouse, and a bitmapped display. See, not much has really changed in II years. So my recommendation for a look at computing in the year 2000 is to go visit PARC today."

Michaels, vice president and cofounder of the Santa Cruz Operation and cocreator of Xenix.

Dennis Hayes, president of Hayes Microcomputer Products, agreed but added that they'll be "so transparent that users will not be able to tell the difference

between a connection to a local area octwork or a wide Many project that computers will become omnig ent - we'll use them at work, at home, in the car. You name the place, they'll be there. Io fact, many predict that we may be using computers without ever realizing we are doing so.

"Computing elements are going to be put inside erythiog, from television sets to copy machines," said icholas Negropoote, founding director of MIT's Media Lab. "By the year 2000, you're going to have a very hard time telling me whether your TV set is a computer or a

Andy Hertzfeld, a software developer and member of

the original team that helped write the Mac operating system, had basically the same take: "The average person by the year 2000," said Hertzfeld, "will own many computers, but be may not thiok he owns any. Television will be what we consider computers — cars too."

Besides discussing the ubiquitous nature of computers in the year 2000, several people concentrated on sixe Many said the most common form factor will be a

ontehook-size computer such as the Dynahook cooon cotebook-size computer such as the Dynathous concept developed by Alan Kay and researcher at Xerox PARC. Others, however, said the PC would be smaller still. Dan Pystars, president of Frontline Systems Inc. and correator of Visicale, expects computers to be highly portable. "I think that most of us will be using computers (that are) book- or watch-size machines. Since technology permits almost anything, you have to think about what people really want. And I think they will want a lot

Dan Bricklin, president of Software Garden and

another cocreator of Visicalc, thicks we'll see computers oo either end of the size spectrum. "Notebook computers will come in, and large computers - what I call

will come in, and large computers — what I can blackboard computers — will come in."

The idea of picture phones is nothing new — we have them today, in fact, although they aren't used in great oumbers. Most seem to agree, though, that the picture phone is the phoce of the future.

"You'll be able to include voice as part of your compound document, just like you'll be able to add full-motion video to memos," says Bob Frankston, chief scientist at Lotus Development Corp. "With gigabyte networks, you'll probably get full concert quality on the phone system. And of course you'll have picture phones. In a world where ISDN [lotegrated Services Digital Network] is available, and we're both running a graphics system, and we both have cameras on our system, why

wouldn't I be looking at you?"

CD ROMs represent another technology that people



Unleash the power of your computer
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# By James Lewis

that helps you do just that!

If you're anything like me, your day is falled with a hundred ideas . . . facts . . . tidbits and thoughts. What if you could capture all this different information on your computer — and then find it and rou it toeether

without wasting a lot of time trying to figure out where the information was in the first place? You'd work more quickly .. and with less effort! Great news: Now, there is an amount of these program

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from a different principle

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PETER BISHOP, PH.D. Professor of studies of the future at the University of Houston, Clear Lake, Houston, Texas.

n the year 2000, we won't call computing computing. It will just be basic work, like the telephone is now it won't stand out as a separate activity."



President of Software Garden and cocreator of Visicalc

ook at "2001: A Space Odyssey" — he goes to o uphnow booth, and it has o little TV. That should be at o matter of course, so you and I would see each other. To do that, though, we will need kope screens. If I'm talking to fire people, I want to be able to see them in reasonable size. But by then, we may turn the desk iro a kope LCD."



BO CO

BOB FRANKSTON Chief scientist, Lotus Development Corp., and cocrestor of Visicalo

Computers are still going to be recognizable, although you'll see some disappearing into the woodwork. You'll have computation or you'wrist. I already have o fillse computer on my wrist that stores dates and remembers things. Why have to big screen when you can just have a heads-up display in your glasse?"



BILL GATES Chairman and CEO of Microsoft Corp.

As far as ease of use goes, it will be like dialing the phone: Everybody will know how. It'll be part of the educational process to learn how to click o mouse."

feet will take on added significance, becoming an integral part of from the user computers. Table as These integral part of from the user computers. Table as the property of the property of

dictionaries. People will move to CD ROM and other torage medium to hold huge amounts of information." Voice input, a technology still in its infancy, will replace keyboards as the primary means of inputting information, according to many of the people we spoke with. "By the year 2000, voice interface to and from the computer should be quite common," said Hayes. "Speech recognition will be easily and affordatbly attainable with the capability of extreme VLSI technolories."

Wayoe Ratliff, developer of Dbase and Emerald Bay, agreed. "Voice input will take the place of keyboards on high-end systems. . I doubt that computers will understand what you say — you won't be able to give it an instruction and have it carried out. The voice input will still be semimechanical, but it'll be a way of avoiding.

keyboards."

Some of the more striking predictions concerned how computers would be used in everyday life. And while some of the skeptics among as worry about the potentially dangerous effect of such uses if put into the "wrong hands," none of the people we questioned were concerned about the negative implications of the

technology.

For example, when asked about the potential dangers of having huge databases of information on each of us, noted science fiction writer Issue Asimov argued against

becoming paranoid about the effects of the rapidly

changing exhanology:

"We see through this before," Asimov said,
"People thought if everyone had a social security
manner, the powerment would be able to keep tack of
them. Actually, if you want to have a repressive
government, you don't need any of hat. Governments
have been repressive all through history and, sa matter
of fact, when they know very little about individuals, they
played it safe by repressing everybody. Nowadays,
maybe, they'll find out who they ought to repress and

leave the rest of us alone. So I'm not afraid of developing tyrannies."

Computer years are like dog years. It's anyone's guess how close these predictions are to what will be happening in the year 2000. Just look at the short history of the computer industry — we've gone from punch cards and vacuum stubes to WYSIWY Graphics and minicomput-

er power in a desktop PC.





ARC STIEGLER Science fiction writer and director of product development, Xaradu Operating Co.

or high-end workstations, the keyboard will be replaced. A user will put on a pair of glasses that will let him work in a three-dimensional virtual world and a pair of gloves to manipulate the world. You will be able to roam up and down the library halls of these services in a cart you control with your gloves. [Executives of] midsized corporations using teleconferencing will be able to wear these glasses and gloves and step into a virtual conference room with the other executives. The

# President and founder of Aldus Corp.; "father of sktop publishing."

t's easy to talk about sechnology, but it's hard to grasp what that will be. The social aspects are most important. Knowledge Navigator in the [Apple] video is an agent in human form with a how tie. Several people have commented that it's probably not wise to make the computer hu man. It can be many things but never human.



ntor of Switcher.

Software developer and member of the original Apple team that wrote the Macintosh operating system; in-

omputers will have senses. The whole point is to communicate, so they're going to listen to you and watch you. They'll have good hearing and vision. It will read your lips; like a pointing device, it could watch your hands. There will probably be some kind of camera built into the front of the computer that hopefully could move a little to follow you. It would abstract huge amounts of information. It will see that you're not smiline and ask you what's wrone."

BOB CARBERRY

Vice president of systems engineering, IBM Entry Systems Division

n the future, you will combine graphics, character recognit images superimposed on other graphics or photographs, audiovisual information that combines voice and the sound quality of CDs as well as full-motion video on the screen."





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# TO THE EDITOR

OSF's Mission

ponse to the Page 1 article, "Users Fear Standards Groups Act as Vehicles for Vendors' Interests" (December 5), I would like to commend Alice LaPlante and Roberta Furger for addressing the standards issue that is of such concern to users and the computer industry. However, there are a number of inaccuracies concerning the Open Software Foundation and its mission that I would like to

The Open Software Foundation was founded in May 1988 (not October 1988) with initial funding by seven of the world's leading computer systems vendors. While some of these vendors have workstations in their product lines, most provide a broad range of systems and services. The description of OSF as "a group of workstation vendors" drastically underestimates our mission and breadth of industry support.

The Open Software Foundation is not a committee. OSF is the industry's first member-sponsored research and development organization aimed at brit iobal acceptance to a single standard for global acceptance to a single seaming. Unix-based systems. We are developing and will deliver in the second half of 1989, an open, standard operating system environment with extensions and sub-

OSF was not formed to "wrest con trol" of Unix away from any other company or organiza tion. It was created to benefit users worldwide by developing a commercial-quality open software en ronment that embraces and expands the best of Unix - namely portability. scalability, and interoperability. Our in tial offering, OSF/1, will be co with all current versions of Unix to protect user investment in Unix and permit users to take advantage of OSF/1

without penalty or delay.

We agree that the real proof of OSF will be in the industry support of our software environment, OSF/1. Based on the enthusiastic involvement of the comnuter industry and users to date, we are

anticipating a positive groundswell of support for our offerings. OSF is a new breed of animal in the computer industry. We look forward to the day when the world stops misreading our "stripes.

> President Open Software Foundation

Look and Feel Legal Questions

s an attorney who is closely involved with the microcomputer industry, I read with great interest Rachel Parker's analysis of the lawsuit filed by Ashton-Tate against Fox Software and SCO (December 5, Page 42), I wish to end her for her accurate reporting of the facts behind the suit and for being the only member of the press to report that the claim of copyright protection for the Dbase language is not directly mentioned in the complaint filed by Ashton-Tate. This is the type of high-quality and accurate reporting that I have come to associate with InfoWorld

However, I would like to provide some

additional background to her legal analysis of previous look and feel copyright Parker concludes that Ashton-Tate's look and feel copyright claims seem "pretty reasonable" based upon the previous Whelan, Broderbund, and Soft klone cases. While Foxbase+ may look "pretty darn close to Dbase," there are ignificant legal and factual differences between these three cases and the facts presented in the Ashton-Tate vs. Fox Software case.

The cases of Whelan vs. Jastrov Dental Laboratory and Broderbund vs Unison World (which were both decided in 1986) are two of the first cases to hold that a program's structure, sequ organization were protectable by the copyright law, and thus were the start of look and feel copyright law. However, the holdings of neither case can be used to conclude that Ashton-Tate has a sure victory ahead. In specific, the Whelan case did not deal with the concept of screen displays for a software progra This result was reached in t Broderbund case, but there is a significant difference between these cases and the Dhase case. In both Whelan and Broderbund, there was evidence of the actual copying of the source code of the infringed program, and thus these two cases can be distinguished on this significant factual difference.

Actual copying of source code was not at issue in the more recent case of Digital Communications vs. Softklone Distributine (1987). This case discussed the concept of copyright protection of screen displays in depth and rejected the Broderbund finding that a program's David Tory copyright necessarily protects the program's screen displays. (Although this does not overrule that decision in any way, since both cases were decided by

federal courts on the same level.)

Although the Softklone case did find that the Mirror program copied the main menu screen of Crosstalk XVI, it did so on the grounds that a separate audio-visual copyright registration had been filed for the main menu screen itself and that there was an infringement of that copyright (but not the program's copyright). It is logical to assume that if this separate registration did not exist, the court would have found no copyright infringement at all based upon the similar-looking screens of the two programs. This is very similar to the facts in the Dbase case, where Ashton-Tate has no separate copyright registration on the Dhase display screen

direction for the court hearing the Dbase case to follow in ruling on the look and Paul Goodman Attorney at Law

New York

Thus the territory of look and feel is

not yet well-charted, and there is no clear

Corrections

feel issue

In "Microsoft Excel Gamers Suppo From IBM, Other Big Corporations" (December 5, Page 5), it was incorrectly stated that Absolute Solutions' accou ing product, Computerized Classic Book keeping, consists of a series of templates for Excel. Instead, the integrated accounting application is written in Excel's macro language.

In "Bugs Delay Rturbo Compiler Release" (December 12, Page 3), Microrim's Rhose Compiler was incorrectly called by its original name, Rturbo. The firm said the nackage will cost \$895.

The video compression and display system from UVC Corp. featured in Impressions on December 19 (Page 58) contained the incorrect product name. The correct name of the system is the VP-

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# RESOURCES

ary 20-22, San Francisco: The Macworld Expo/San Francisco will take place at the Civic Auditorium, Brooks Hall, and Moscone Center. More than 400 companies will display Macintosh hardware, software, and peripherals. Contact: Mitch Hall Associates. (617)

lansary 30-February 1, Burlingsme, CA: "Networking With Netware" offers a two-day hands-on course and a one-day advanced course on working with Novell's Netware LAN products. networking seminar will also be held in seven other civies in the first quarter of next year. Registration: hands-on, \$595; advanced, \$395; \$895 for both; group discounts are available. Location: Sheraton International. Contact: Accelerated Learning Center, 311 B Ave., Lake

January 31-February 2, See Francisco: The Database '89 Exposition and Conference will feature more than 100 exhibits. including relational databases, fault-tolerant computing and database machines, Unix products, CASE technology, development tools, end-user tools, and LANs and gateways. Conference registration: \$225 per day, \$595 for three days. Location: San Francisco Hyatt Regency. Contact: Charlie Hurth. (415) 941-8440.

Oswero, OR 97034: (800) 338-0562.

February 2-4, Dallac: Infocomm Interna-tional features develoriments in communications technology. Location: Dallas Convention Center. For more information call (703) 273-7200.

February 28-March 2, Boston: Networld

'89 offers users access to hundreds of networking products for hands-on demonstrations. The show also includes a series of seminars. The keynote speaker is James Bruce, vice president of information systems at the Massachusetts Institute of Technology. Location: Hynes Convention Center. Contact: Networld. P.O. Box 1521, Englewood Cliffs. NJ 07632

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resolution up to 800 x 600 with 16 colors, or 640 x 400
with 256 colors.

We even offer a 256K memory upgrade that gives you 640 x 480 with 256 colors and our exclusive non-interlaced 1024 x 768 with 4 colors.

interlaced 1024 x 768 with 4 colors.

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connectors as the IBM PS/2 Display Adapter, to accommodate hardware add-ons in the future. What's more, your current VGA software—or

What's more, your current VGA software—or any you plan to buy—is guaranteed to run on FastWrite VGA. Even OS/2 products. It's backwards compatible with EGA, CGA, MDA and Hercules modes. So all your software will run faster than ever before.

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blindly into your wallet.
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e following are registered and unregistered trademarks of the companies liked: End'Wine VCA, Voleo Seven Inc., Hercules, Hercules Computer Technology, Inc., FS-72, Display Adapter, complored Display and Label Engineers pre

the difference.

# RIDING THE FOURTH WAVE • By JEFF ANGUS



# Fourth Wave Awards for 1988: The Year of the Wimp

According to the Chinese calendar, 1988 was the Year of the Dragon. My Scottish calendar indicates it was the Year of the Wimp. Evidence of whiners and an ineffectual frittering away of human and machine resources was everywhere. The dance of graedom chance being what it is, though.

there were notably great events as well.

Here are the first Fourth Wave Achievement & Bereavement Awards:

The Sung Dynasty Award, to a pair of presidential candidate/wimps who could not shoot their way out of a paper bug with a bazzoka and four rounds of ammon. All dominant societies have a become subtly democratized, their citizenship so enervated they become apathetic about preserving their culture. The faciliation of the country of the country of the country of their citizenship so enervated they become apathetic.

tors that filter and promote political power become different from those that promote the society's survival. The candidate/simps reek of Ghost Dance.

The LBO Wanna-Be Award, to an eruption of onamistic, self-indulgent liti-gation by big established companies.

MS winney countersuit against Applie, Ashton-Tate's whiney claims against Dasse cloners, MS miveling litigation Dasse cloners, MS miveling litigation

against Borland when Borland hired away Rob Dickerson, MS only brilliant highlevel marketing person: ad nauseam. When big companies like this pursue intigation so hobly, it means they've catered their own Ghost Dzace. They are catered their own Ghost Dzace. They are catered their own Ghost Dzace. They are catered their own Ghost Dzace. They rely on licensing and litigation to harvest high-terum dollars, insetted of

trying to fight it out with quality product. The Wessel Boy Award, to Brown Bug Software's whency sur to against John ferond, developer of PC-Outline, When Ferond, developer of PC-Outline, When Bug on his product (which they'd bought of \$250,000 but paid him far less than half thath, ultimately developed another midwigs and Circular William Publisher. Reasons mentioned in the suit includes derivative of PC-Outline because it incortions of the contention to the Circular developer of PC-Outline was a derivative of PC-Outline with a color for the screen background were the

same.

The Oliver Twist Award, to a couple of vendors who whined incessently to the InfoWorld reviews department about bow low their scores were, even though one of them was about 7.5 'ever good) and the other about an 8.0 (even better). So much for the Babe Rutts of grief. Some positive things occurred in '88. and for those efforts we sive Augusts the Wind for those efforts we sive Augusts the Wind for those efforts we sive Augusts the Wind

Awards, in no hierarchical order, to:

\*Traveling Software for Mac Link; the
Laplink program that connects DOS
machines and Macs for high-speed file
exchange. For DOS-shop micro manage.
ers still fighing to get Macs to users who
could be productive with them, this
product was the final argament. With
Mac Link, the specious "non-connective".

Software Publishing for the ease of use and learning of Professional Write 20, an executive word processor that makes technical support a virtual non-issue. While not yet perfect, it's close.
 Borland International for Sprint, a

Borland International for Sprint, a customizable word processor that can be modded to users' strengths, instead of forcing users to bend to its world view.
 Clarion Software for Clarion Personal Developer a code superprise that mute.

al Developer, a code generator that puts prototyping in the hands of end-users, where it belongs.

• Paul Mace for the unrivaled utility of bis new book, The Paul Mace Guide to

ons new book, The Falls Mace Ginne to Data Recovery, for the fact that it acknowledges that people might use other products besides Paul Mace Utilities, and for its unprecedented-in-a-computerbook readability and literary style.

\*\*Obesta Corp, for Data Deal Profesional, Version 2.0. The art Deal Profesional, Version 2.0. The art Mac II attained to the profesional version and the art Deal Resident and the art Deal Resident analysis. Each chart or result comes with a meta of follow-up chooses for further analysis — a rudirentary expert system of sorts. It brilliance, like many of the Against the Winders, is not so much in technological accomplishment as in taking an intelligent approach to increasing user productivity.

 And last but nowhere near least, for the brave implementors and installers who successfully weathered the Year of the Wimp.

Jeff Angus was a systems analyst and technical support specialist for a consulting firm.



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This new dot matrix printer can do a lot for your image. For a lot less. The NX-1000 Multi-Font gives you four

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To see where you can find the Star NX-1000 Series, call 1-800-447-4700.



\*Manufacturer's suggested retail price in U 8

program has the nasty habit of "correct

ing errors" on your hard disk without telling you in which file the correction

was made. Since the "correction" is often

a best guess, it can be wrong, which is no

great problem if it happens in a text file

(although I think we all recall the story of

the author who took a gun and shot the

printer that printed not instead of now):

but if it happens in a command file, it

could be pretty serious. If Spin Rite told

you what it had done, you could compare

the file with a known good copy; but it doesn't. When told of this, Gibson said he

was fixing the problem: Future versions

of Spin Rite will report exactly what they have done

soft sector on my hard disk that Spin Rite

Another frequent nominee for or

was the U.S. government for the RAM

cartel, and again for the more stringent FCC rules. I've already discussed those,

Incidentally, Prime Solutions' Disk Technician Advanced already reports what it has done. DT+ also found one

# A USER'S VIEW . BY JERRY POURNELLE

# Windows Makes Gains, Government Takes Step Backward

wax eloquent because no one is There's only one problem. I don't usually have trouble writing my columns, but this time it's different. First, it's late. It's the middle of the night in Dedham, Massachusetts, a place I've never been before. I've been up since 0600 California time trying to get here. TWA canceled my first flight, then routed me through New

It's the end of the

year once again, the

time when pundits

years OS/2 will claim its share of the PC market, but it's not going to happen all that soon; even Microsoft officially says that QS/2 won't have an installed base of users to match what DOS has now before

On the other hand. Windows did make considerable progress in the past year. Annie's lawsuit, which looks like it was intended to cut into Windows' sales. seems mostly to have made people notice HP's New Wave Windows implementation, which, I have to say, is pretty spectacular. Apple was probably right to

Chip cartels help IBM. Tl. and anyone else who makes chips for internal consumption. High chip prices mean higher clone prices. Except for the big boys with their own chip factories, though, it's hard to see who else these government-spon-sored chip cartels benefit. Even so, there is always plenty of lobbying pressure to build those cartels, while the people who are most hurt by high chip prices don't seem to know how to get themselves

ICING GAME. Let's face it, the rules of the political game have radically changed. Congress persons can legally accept PAC campaign money — and if it hasn't been spent before they leave office, that campaign fund money can be converted to other uses. However, the real purpose of the big campaign war chest is to intimidate the opposition. Who wants to run against a chap who already has a million bucks in the bank?

Rig outfits understand all this and hire professional political management firms to advise them. They encourage multiple political action committees (PACs) among their employees. (There's a limit to what one PAC can give one Congress critter, but there's no real limit on the

number of PACs that a group of people can form.) The result is our chip cartel and the ngent FCC regulations. Nowadays you can't just design a computer and start selling it. You have to get FCC certificasale. That takes both money and time

44 A

and besides, the crucial actions didn't happen this year. I do think we could to be vigilant to see that government doesn't make things worse next year. Another nominee was Microsoft for its Programmer's Library CD ROM. In every case, people said they loved the CD

ROM - it has all kinds of programmeroriented documentation, all well-organized - but the implementation leaves much to be desired. There are bugs in the tion before you can offer the machine for access code, and the access programs are too large. Since the CD ROM is good The result is to raise the stakes greatly for enough for an award, I don't feel right

that in spite of all the preliminary hype, OS/2 sort of crept in like a lamb. Perfect Writer made a bigger splash back in CP/M days." worry: New Wave can make the PC as

Maiting for OS/2 was like waiting for

Godot. Now that it's here, maybe we can get on

with something else. The interesting part was

York, My bag is said to be on a cart somewhere, only they're not precis sure where. It'll be in Massachusetts Real Soon Now, Meanwhile, I've got to give a briefing on the space program in the morning and get this column written tonight, after which I can worry about how to make the telephone system work

Heaven knows what I'll wear tom row. You can, I suppose, judge my faith in high-tech travel by the fact that I have my briefing charts: I trust the airlines to get me and my briefcase where I've set out to go, although it may (as it did today) take a lot longer than I expected to get there. On the other hand, TWA has my

Of course, I also have my comput er gave TWA a shot at that. The Zenith Supersport is working fine, now that the interlock switch is uniammed. That is, the Supersport beeps a warning if you have it turned on while the case is closed. When I turned it on just now, it beeped mercilessly. At first I thought it was low power, but I had the system plugged into the wall, so that couldn't be it. After spending the whole day getting here, having my airplane cancel meeting two more planes that were d to have my bag and not finding it, my first thought when it looked like the Supersport was broken was, "Why not?" However, a couple of moments of sanity plus a minute with the Swiss Army knife took care of the stuck interlock switch, and now things are working fine, so I haven't got any excuses. It's time to nontificate

THE MAIN EVENT. I suppose the most significant event of 1988 was the intro-duction of OS/2. Waiting for OS/2 was like waiting for Godot. Now that it's here. maybe we can get on with something else. The interesting part was that in spite of all the preliminary hype, OS/2 sort of crept in like a lamb. Perfect Writer made a bigger splash back in the days of Now. I have no doubt that over the easy to use as the Mac, and meanwhile there's still a command line for people who get tired of dragging disk icons to the I've always thought that the real futu

of small computers would come about when a lot of people began writing programs. If you couple New Wave with the new object-oriented language Actor. you get closer to the kind of system I had

Object-oriented languages are quite different from procedural languages like Pascal or Basic. It takes awhile to get used to them: but once you do, you find it's easy to write small programs to get things done; and since object-oriented language are structured by their very nature, it's simple to collect building blocks that can be put together to make bigger programs. New Wave, Windows, and Actor have a real potential that may take awhile to develop - we'll probably want to see memory prices come down - but the up

CHIP CRUNCH HITS HOME. Of course, it may be awhile waiting for memory prices. We're only now seeing the real chip crunch created by the U.S. governmen cartel. The worst of it is that having urged the Japanese to take higher prices tha they wanted ("Please don't dump thos DRAMS on us! Please don't fulfill all those contracts for cheap DRAM!"), we did nothing to supply the chip deficit ourselves. Meanwhile, the Japan vested much of their windfall profit into megabit DRAM technology and are prepared to flood that market. It's highly unlikely that the United States will be able to capture any significant share of

We can react to that either by taking the opportunity to buy chips at low prices

— megabit RAM chips are the ways of the future, and the price of four 256K. chips will never again be lower than the price of a 1-megabit RAM chip — or we cor dy to build another chief to force chip prices up.

nother frequent nominee for onions was the U.S. government for the RAM cartel, and for the more stringent FCC rules. I do think we ought to be vigilant to see that government doesn't make things worse next year."

getting into the game. Apple computer never have started under the current FCC regulations. Me, I'd rather move my TV or hi-fi set than pay all that extra for my machines. It's one thing to aire that computers not be so not that they interfere with air traffic control or even annoy the neighbors. It's quite another to protect us from some hiss on Moreover, the regulati haven't really done it: I notice that certain outputs from my big 386 show up as noise on my FM radio, and all my equipment is shielded and has passed FCC certifica-

I don't really expect things to change but if I could have a wish for 1989, it would be that the federal government treat the computer industry to some

some concers. Every year I conduct a poll among my readers. The question: "What happened last year that made you unhap-I set a lot of candidates for the annual

benign neglect.

One was Spin Rite: Steve Gibson's

about handing Microsoft an onion. I do hope they'll come out with some revised access software.

TOO MANY LAWSUITS. The clear winners of the annual onion, though, are all the companies that think they will be better off investing resources in lawsuits than in developing better technology. Unfortu-nately, there was a number of them, In some cases the issues aren't clear cut perhaps some of those lawsuits have merit. On the other hand, most of us would rather see the industry's money paid to programmers and engineers than lawvers. My suspicion is that no matter what the merit or outcome of those suits, every one of us, including both parties to the lawsuits, would be better off that

It's now 0400. I have to be up at 0800 to deliver my briefing. My suitcase is still in the toils of TWA's baggage smashers. This ought to be interesting

Jerry Pournelle is a noted science fiction witter and consumer comment. The views expressed are his own.



# If you're building for your company's future, you need the right foundation

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# PRODUCT COMPARISON

# **16-Bit Video Boards**

BY TRACEY CAPEN AND SALLY J. DOUBLAS INFOWORLD TEST CENTER

The latest bevy of VGA hoards takes video resolutions to new heights. Vendors claim the

new architecture makes their cards twice as fast as the old guard. InfoWorld looks for business applications that prove it.

very six months the computer indu try is smacked io the eyes with one or another veodor's oewest and greatest in video technology. Things ed more slowly as color came of age in EGA, but ever since IBM introduced VGA in its PS/2 line of machines, we've been treated to a perpetual show of The newest race isn't based solely on

oumber of colors and degree of resolu-tion, however, Soluttered across news pages and advertisements is the "in" variant, 16-bit video boards, Vendors' ims for these boards range from faster ed to better overall performance since the boards move data 16 bits at a time, twice as fast as their 8-bit predecessors This throughput should be faster for applications that write to the screen in 16-

To see just what the hubbub is about. we looked at seven of the curreotly shipping 16-bit boards from five vendors. (Since our editorial calendar doesn't accommodate vendors' shipping schedules, only these five manufacturers were able to meet our deadline for testing. A oumber of other makers have announced 16-bit boards, including Ahead Systems, AST, ATI, Genoa, Orchid, Quadram, Sigma Designs, and SOTA.)

Although all the boards have 16-bit buses in common, they cross quite a wide spectrum in features. At the lower end is the Compaq board, which has been around since late 1987. It offers VGA resolutions only, oo software drivers, and just 256K of RAM. At the other eod of this multicolored spectrum is the Video Seven V-RAM. It comes with more than 15 software drivers, offers state-of-the-art video RAM technology, and provides the highest resolution, 1,024 by 768 pixels, of any board we saw

Compag Video

Graphics Controller PRODUCTS REVIEWED The Compaq VGC is the real grandfather

of 16-bit boards. Compaq was the first to Compan VGC ... come out with a 16-bit board, in November 1987. But since then the Hewlett-Packard VGA Paradise VGA Professional company has not updated its board, and Paradise VGA Plus 16 ...... the competition has overtaken it. Along with its Paradise chip set, the Compag Tecmar VGA/AD..... VGC has 256K of RAM and a completely Video Seven Fastwrite switchless setup. The board is simple in design yet sturdily built. Video Seven V-RAM .....

InfoWorld Report Card.....

Executive Summary.....

The Compaq VGC bad oo difficulties running our suite of software applica-tions, including Microsoft Windows 386



and OS/2. The VGC's software competibility earns an excellent. Compaq offers only standard IBM VGA resolutions with its board - which downward-compatible with CGA, EGA, and MDA - but the board will oot run Hercules. Resolutioo earns a good

Speed times for the Compaq VGC were average, overall, though slightly slow to the Word 4.0 graphics-mode test. Speed earns a score of satisfactory As in the past, Compaq does oot ship any drivers with the VGC board. We rate

PRODUCT SUMMARY Compaq Video Graphics

Controller 20555 FM 149, P.O. Box 692000, Houston, TX 77269; (800) 231-0900. List Price: \$599 /256K)

Software drivers: None Additional resolutions: None. Chie set: Paradise Board size: 16-bit; full feneth. Support: One-year warranty. Prost Switchless setup Cons: No extended resolutions or soft ware drivers; dealer-only support. mary: A midpriced, no-fuss board with limited features but solid perfor-

mance.

the special drivers category poor.

Compag's impressive documentation has not changed since it first introduced the board. The manual includes ample photographs throughout, although they are taken from a preliminary board. Io one case, the photograph shows three jumpers on the board but the shipping version has only two jumpers. It is still

easy to set the jumpers correctly Installation is covered thoroughly, but the examples illustrate Compag syste only. The manual has a detailed table of contents, an index, glossary, and a listing of all tables and figures. There is no troubleshooting in this book, but Compag sells an extensive technical reference guide for \$79. Documentation

earns a score of good The Compaq VGC is the only board in this comparison without DIP switches. Installion the board simply requ setting the two jumpers for 8-bit or 16-bit mode, plugging the board in, and turni system. We can't imagine on your system, we can't imagin-unything simpler. This extra easy proce dure earns the VGC an excellent in setup Similarly, once the VGC is installed it

oeeds oo attention whatsoever, although lacking drivers you can't employ higher resolutions. Ease of use also rates an There was one fairly long wire added

to the froot of the Compaq VGA board. Aside from this, the board has all surfacemounted components, an IBM features connector, and one 15-pin video coopector. Workmanship earns a very good Compag offers a one-year warranty on

INFOWORLD

and BIOS compatibility.

The HP VGA easily navigated our

software compatibility tests. We ran Lotus 1-2-3 graphics in CGA, EGA, and

VGA modes, and PC Paintbrush in 256

colors. We were able to bring up a Lotus

The board worked equally well with

otus or Rhase under Microsoft's OS/2

Both the 256K and 512K versions of

column text and 800-by-600 graph-

HP's VGA ranked high in our video

Software compatibility rates an excellent

the HP VGA support all standard modes

of MDA, CGA, Hercules graphics, EGA,

and VGA. In addition, the boards support

ics. The 512K model boosts the maxi-

mum resolution to 640 by 480 pixels in

256 colors. We rate resolution very good.

speed tests. It was equivalent to the Video

Seven Fastwrite and the Paradise Profes-

sional, overall, and generally faster than

the Tecmar or Compag boards. It was

quickest, by a second, in our Autocad

redraw test when configured as an IBM

VGA adapter. However, the board was

the slowest in the Autocad redraw with

the ADI driver, at 13 seconds. This gives

software drivers on both 514- and 31/1-inch

disks, including 640-by-480 and 800-by-

600-pixel ADI drivers for Autocad 2.18

or later. There is a 640-by-480 driver for

Windows 1.03, but drivers for Windows

HP provides a very sparse selection of

the HP a rating of satisfactory.

work with an HP dealer

raph under Microsoft Windows

the VGC board. Technical support and repairs must be obtained from dealers, who also offer extended-service options.

Support policies earns a poor. We called San Francisco Bay Area Compaq dealers for belp with the VGC but received very limited belp. Most could answer questions about the board's features, but even then some could not tell us how to use the board with a multiscanning monitor. Help on a deeper technical level could not be found. we've seen in every comparison, dealeronly support is not nearly as good as a vendor-maintained line. Compaq's sup-

nort rates a noor Switchless setup, fuss-free use, and solid performance highlight the Compaq VGC, but the lack of drivers and extended resolutions greatly limits its appeal. At \$599, this board is \$100 more expensive than the fuller featured Paradise VGA 16 Plus and equally priced with Video Seven's Fastwrite. As the competition continues to introduce higher resolution register-compatible boards for lower prices, the VGC has dropped in value. (The VGC was a satisfactory value in our last product comparison of video boards. June 27.) In tight of the new competition. the VGC's value drops to poor.

# Hewlett-Packard VGA

# NEWS ETT-BACK ARE

Hewlett-Packard's latest entry into the VGA market is the HP VGA D1180A Introduced in May 1988, this 16-bit VGA video adapter is shipped with either 256K. or 512K of on-board video memory. Currently HP is selling the majority of these adapters with its Vectra systems, but they are compatible with almost any PC. The HP VGA is based on a Paradise chip set and claims IBM VGA register PRODUCT SUMMARY

# Hewlett-Packard VGA

Company: Hewiett-Packard Co., Custommation Conter, 19310 Pri Ave., Ozpertino, CA 95014; (800) 752-

List Price: \$445 (256K); \$670 (512K). Sefbrare drivers: Autocad: Cadva Lotus 1-2-3; Windows 1.03; Word Per ect; Wordster 3.3 and Professional 4.0. Additional resolutions: 800 by 600 (16 colors): 132-column text. With 512K

version: 640 by 480 (256 colors). Chip set: Paradise Beard size: 16-bit; full length. sport: One-year warranty Pres: Least expensive: good performanoe; upgradable to 512K.

Coes: Very few drivers: dealers unfar iar with board. Summary: A solid, low-orice board, but competitions offer much more.

batch file for automatic setup. Other than Compaq, which did not provide any drivers. HP is the only VGA board that did not include any type of RAM BIOS utility, which copies the BIOS to RAM to speed performance. However, based on the results of our speed tests, this is not a handican. The low number of software drivers earns a poor score.

2.0 or Windows 386 are missing. HP was a little vague about when these drivers The user manual, although plain, exceeds the minimum requirements for would be available. Also included are drivers for Cadvance, Word Perfect, Wordstar 3.3 and Professional 4.0, and documentation. There is a table of contents, index, specifications page, and elossary. The text is printed in a large, 132-column text. For those users seeking additional drivers, the only option is to clear font and is not overly technical There are many helpful diagrams. The A utility called HP VGA allows manual is three-hole nunched and fits the keyboard selection between the various standard IBM-style documentation bindvideo modes, or it can be installed into a er. The binding is stapled and, with a little bending, the manual can be left open to any desired page.

All installation and switch setting in the user guide refer to the Vectra computers. If you are installing the board in a non-HP computer, you are instructed to bypass the installation chapter alto gether. The installation instructions are detailed and the diagrams look similar to common PCs and should be usable for most novice users, regardless of the system. The discussion of the DIP-switch setting is more specific; you may have greater difficulty applying this to non-HP computers. The instructions for instr software drivers are brief, but sufficient for anyone who is familiar with the appropriate application. HP includes helpful troubleshooting and specifications sections, and a page on warranty and service procedures. The manual does not give any technical support numbers but instead refers you to your local HP

dealer. The documentation rates a good. The HP VGA is easily and quickly stalled. It can be inserted into either an 8-bit slot or, for greater speed, a 16-bit slot. The VGA's four DIP switches are located on the upper edge of the board, so the computer must be opened to change the setting. The default-switch settings, although factory-set for HP Vectras. worked flawlessly on our Compaq 386/ 20. Setup and ease of use both rate a good.

The VGA's workmanship meets the same high standards found on all the adapters reviewed. The majority of components are surface mounts and the 512K memory is soldered in, assuring a high level of reliability. We found one natch wire, but that appeared to be the only modification. The adapter has one unusual feature: There are matching pin connectors next to the bus and accessory connectors. This gives greater flexibility for adding future accessories. Workman-

# How We Tested and Scored 16-Bit VGA Boards

ur testing and scoring procedure is based upon our most recent comparison of VGA boards (June 27, 1988), with enhancements primarily in the number and type of special drivers provided and in our speed tests. Here's how we tested and scored Performance is divided into four cates

compatibility, resolution, speed, and special drivers. Compatibility: Our compatibili of Lotus 1-2-3, Version 2.01, in CGA, EGA, and VGA odes; Windows 386 running Lotus 1-2-3; and PC ntbrush (320-by-200 resolution in 256 colors). We also installed the boards with Compaq's version of OS/ 2 in a Deskoro 386/20 and ran Rbase for OS/2, as well as Lotus in the DOS compatibility box. According to Microsoft, both Windows 386 and OS/2 write directly the VGA registers.

To run either of these programs, therefore, boards must be either register-level VGA compatible or include software drivers to work around the problem. oards that pass all components of our test suite earn an excellent score in compatibility. Failure to run any appears lowers the score.

Resolution: Resolution is scored on a continuum that includes the most popular PC graphics standards, including CGA and EGA, Standard VGA boards that sport Hercules, CGA, and EGA, in addition to VGA's 640-by-480 mode, earn a very good score in resolution. Boards that offer several addi tions, such as 800 by 600 and 1,024 by 768 in 16 colors. or 800 by 600 and 640 by 480 in 256 colors, get an excellent score in this category.

Speed: In spite of vendor claims to the contrary, all boards showed similar speed performance the last time we compared VGA boards. We're now starting to see some differences, but it's still not a big issue Autocad. Version 2.62 in VGA and with an ADI 800by-600 driver if provided by the board manufacturer. In Autocad we redrew the sample file of a coupler. We

then ran Microsoft Word 4.0 in graphics and text mode, timing the scrolling of a 10-page ASCII document Word in graphics mode and the Autocad ADI test showed the greatest speed variations between the cards, but our other tests continue to show that speed differences are slight. All boards, except the Video even V-RAM, still earn a satisfactory in this category The V-RAM, which showed the consistently highest eed, earns a good scor

Special drivers: Higher resolutions are worthless unless the software can take advantage of them. We therefore score boards based on the number and variety of software drivers included. Boards without drivers rate a poor score in this category To earn a satisfactory, a board must offer a 640-by-480, 16-color driver for Windows; 640-by-480, 8-color drivers for both Autocad and for Lotus 1-2-3; and a 132-by-43-column text driver for Lotus

Beyond this we award one-half point for each of the following drivers: 1,024-by-768 for any program; 800by-600. 16-color for Windows 2.x and/or 386 600, 8-color for Autocad (any version); 640-by-480, 256-color for Autoshade; and 640-by-400 for either version of Windows. One point is awarded for any 800by-600, 256-color driver and a 640-by-480, 256-color driver for Windows (any version).

We installed the highest-resolution 132-column Lotus 1-2-3 driver included with each board, as well as any drivers above 640-by-480 resolution for Windows 2.03 or Windows 386, and the Autocad ADI drivers to test their operation.

Documentation scores reflect the quality and empleteness of written information. At a mini documentation should describe the product and how to install and use it. Bonus points are awarded for step-bystep instructions for novices, a quick-reference card. and a separate manual discussing the software included with the board. Poor organization, missing information or an incomplete index lowers the score.

Setup and Ease of Use: With a few exceptions, there is no difference when it comes to installing and using any of these VGA boards; most are rated good. In setup we consider whether or not the board has DIP switches or if it requires any special setup help. Ease of use is even more basic for these cards. Fuss-free boards that lack software for higher resolutions, like the Compaq, get higher ease of use scores, though they suffer in capability. The other boards differed little. Serviceability is divided into workmanship, sup-

port policies, and technical support for each board Workmanship: To score workmanship. InfoWorld technicians evaluate the construction and design of each board. Last-minute additions, such as added wires or caracitors, lower the score. Use of surface-mount components (which reduce the chip count) raises the workmanship score.

Support policies scores reflect vendor warranties and guarantees and whether they offer technical support. A one-year warranty and vendor-provided technical support results in a satisfactory score. Extended warranties, money-back guarantees, extended technical support hours, and toll-free lines boost the score in support policies. Due to the inconsistency of dealer knowledge and cooperation, the lack of vendorprovided technical support lowers the score.

Technical Support: We make several calls to vendo and dealers to determine the quality of technical support. Scores reflect the quality of service, how easy it is to get through on the line, and bow quickly calls are

Value: Boards tested range in price from \$445 to \$1,098, depending on features and memory. Scores reflect the price/performance trade-offs for each. As noted in individual write-ups, two boards that received bigh value scores in prior reviews and comparisons are now scored lower. While the performance and features of these boards have not changed, other products now available offer a better buy for the money.

# Two new DESQviews.

# They're everything you want in windowing environments.

DESQview™ is the operating environment that brings OS/2" power to DOS. And it lets you, with your trusty 8088, 8086, 80286, or 80386 PC, leap into the next generation in PC productivity. For not much money. And without throwing away your favorite software.

# Introducing DESOview 2.2

And now, DESOview 2.2 adds capabilities, performance, and compatibility enhancements you've been asking for:

Like being able to fine tune DESOview performance "on the fly." Run Lotus Express and Metro. And the Intel Connection Co Processor. Even use the DOS 4.0 shell with DESOview. Have DESOview automatically install Quattro, Sprint, Aldus PageMaker, Microsoft Excel, Word Perfect. Dataease and as many as 80 other programs. And using the DESOview APL be able to dynamically link them.

# More bang; less bytes

While other programs get bigger, we've worked to make DESOtask communications and multview smaller. And we've succeeditasking, brings a quick and ed in a big way on PCs and easy way to adapt to the future With the APT's mailboxes and PS/2"s with extended, EMS 3.2 shared programs, programmer (AboveBoard), EEMS and EMS are able to design programs nunring on DOS with capa 4.0 memory—as well as on 386 PCs and PS/2s. For example, ties like those of OS/2. DESOview overhead on EMS 4.0 and 386 PCs



DESOview actually increases memory 30K on CGA PCs: 20K on monochrome and Hercules PCs. That's good news for users of big desktop publishing, CAD and database programs.

# Introducing DESQview 386

For users of 80386 PCs and PS/2s (or PCs with For programmers, DESOview's APL with its strengths in inter-

80386 add-in boards, such as the Intel Inboard 386), there's DESOview 386 (a combination of DESOview 2.2 and the new OEMM-386 Ouarterdeck Expanded Memory Manager, version 4.2). DESOview 386 gives you extraordinary power. Run text, CGA, EGA.

VGA, and Hercules programs in windows and

like Paradox 386, and IBM Interleaf simultaneously with your favorite DOS programs. All with the speed and performance you expect out of your 386. And with protection against 'misbehaved' programs.

# Promise and performance

And, of course, both DESOviews have all the features that made prior versions the popular choice in operating environments. The ability to multi-Did you buy another envitask in 640K and

rorment that hasn't lived up beyond. View proto your expectations? Trade up to new DESQview. See grams in windows coupon below. or full screen.

Transfer data. Access DOS via menus. Dial your phone. And create keystroke macros

within and between programs.

# Our story gets better and better

If there's any doubt about our commitment to your PC and PS/2 productivity, just look at our accomplishments over the years. We think you will understand why PC Magazine gave DESOview its Editor's

. Choice Award for "The Best PRODUCT Alternative to OS/2," why OFTHE readers of InfoWorld twice YEAR voted DESQview "Product of the Year," why, by popular vote at Comdex Fall for two years in a row, DESO-

view was chosen "Best PC Environment" in PC Tech Journal's Systems Builder Contest.

DESQview System Requirements (BM Personal Computer and 100% manipalities (with 80%, 8081, 802%, or 803% processors)	YES!	Oty Product		51/4 31/2	Price Each	Totals
with muschrome or color display; BM Personal System, 2* Moreover 640K recommended, for DESCriew model 6 145K*	I need increased	DESOview 386 Multitasking windows	ng environment		\$189.90	
	1 need increased	DESOview 2.2 Multitasking windows	g environment		\$129.95	
compatitie with the basi Abovellourd, inhurant coperated manuscr boards compatible with the AST RANSourc FAS 6.0	productivity now!	DESOview 2.2 Upgrade from DESOv	iew Version 20		\$24.95	
extended memory boards "Dek; two-dalartic drives or one	productivity now.	Upgrade from DESOview 1.0 & A.	5T Special Edmons)*	1 1 1	\$60.00	
dislate drive and a hard disk "Graphics Card (Optional) Herman, IRM Color (Graphics (CLA), IRM Technology Combine		Upgrade from Topview, Windows,	Visi-On, etc.)**		\$65.00	
(BCA), 384 Personal Swarm / 2 Advanced Counting (VCA)*	. Payment @Visa @MasterCard	QEMM-386 Version 4.2			\$59.95	
Mouse (Detectal) Mouse Systems, Microsoft and computitions Madem for Auto Daint (Detectal) Hope, or computition	Expiration /	QEMM-386 Version 4.2 Upgrade from	n QEMM 1.0-4.1*		\$19.95	
Operating Systems PC-005 2042; MS-005 26-33+ Subvause Most PC-005 and NS-005 application programs, programs assembly to Machine 105-31 (2001) 136 (804	Account #		Shipping & Handling \$5 i	Calif Resident	s add 6.5%	
Tor View 1 1+ Media, DESChnew 2.6 is available on either \$-1/4"	Name			-	Grand Total	
or 34/2' Reppy delecte. Trademarks are property of their respective helders. 1864, OS/2,	Address	40	uarterd	agh		
PS/2, Lotus, Express, Motor, Quatter, Sprint, Aldrus, PageMaker, Intel, Above Board, Hornsley, Mouse Sentens, Harres.	CityS	tateZip	antista.	2001		
Microsoft, Windows, Escel, Ward Perfect, Camerasi, Paradox 386, Interfect, Top News.	Quarterdeck Office Systems	, 150 Pico Boulevard, Santa Monio	a, CA 90405 (213) 39	2-9851 Fa	c (213) 39	9-3802

ship rates a very good. HP ties with Compaq for offering the shortest warranty: one year. Boards need ing repair are shipped to HP which nates turnaround time to be seven days or less. HP sells directly to its largevolume corporate clients; for those buyers

it offers technical support as well as extended support plans. Support bours are 7 a.m. to 9 p.m. Eastern time, Monday through Friday. For small businesses and other individuals, HP refers you to its dealers, who then provide exclusive support. Since the majority of InfoWorld ders will have to buy through dealers, we rate support policies and technical support on a dealer-only basis. As with Compaq, we have found that dealer-only support is a hit-or-miss proposition, and

support policies rate poo We did call several HP dealers in the area to check their responses. None of the rs we contacted was familiar with the HP VGA or its drivers, and some had never even seen the board. None of the ers was able to provide help to a simple question on setting up Lotus 1-2-3 with the HP VGA. (Due to HP's knowledge of its large-volume buyers, we were unable to make our usual anonymous calls to the company's direct technical support staff.) The inability of dealers to help us with this product drops

the technical support rating to unaccept-The HP is a real bargain when considering price alone. The HP VGA retails for \$445 for the 256K model and \$670 for the 512K version. This makes the HP the least expensive 256K 16-bit VGA adapter of the boards we reviewed. In the 512K category, its prior is also the lowest. It does, on the other hand, suffer greatly from having few software drivers and unacceptable technical support. We rate value satisfactory

## Paradise VGA Professional

The VGA Professional is the first of two 16-bit boards from Paradise that sports its own chip set and ships with a wide variety

of software drivers. The Professional comes with 512K of RAM and is register-The Professional passed all our software compatibility tests. The board performed well with Windows 386 and

OS/2. Software compatibility earns an excellent score. Offering Hercules, MDA, CGA, EGA, and VGA resolutions, including 320 by 200 nixels in 256 simultaneous colors, the

# PRODUCT SUMMARY Paradise VGA

Professional ery: Western Digital Imaging, Paradise Systems Inc., 800 E. Middlefield Road, Mountain View, CA 94043; (415)

List Price: \$799 (512%). Seftware drivers: Autoced; Lotus 1-2-3; dows 2.0 ditional resolutions: 640 by 400 and 640 by 480 (256 colors); 800 by 600

(16 colors); 132 column text. Chip set: Paradise. Board size: 16-cit; full length upport: Three-year warranty.

Pres: Extensive high-resolution drivers. Coss: Expensive for a 512K board. ary: A solid performing board with a midrange orice

goox

Professional meets our basic resolution requirements. Beyond these, the Professional offers 132-column text resolutions, 640 by 400 and 640 by 480 pixels in 256 colors, and 800 by 600 in 16 colors. Resolution for the Professional earns a

very good though Paradise says the Profess will show impressive speed using its 256-color Windows 2.0 driver, we could not compare and substantiate this claim since there are no other boards with similar drivers. In our other tests the Professional performed with average speed, although it was a bit slow on the

Autocad ADI test. Speed earns a satisfac-Puradise surpasses its competitors i Windows 2.0 drivers, with 640 by 480 pixels in 16 and 256 colors, 640 by 400 in 256 colors, and 800 by 600 in 16 colors. Unfortunately, Paradise does not yet provide drivers for Windows 386. For

ocad, Versions 2.x and 9 there are 800-by-600 eight-color drivers. For Autocad, Version 2.x only, Paradise also ships a 640-by-480 eight-color driver. For Lotus 1-2-3. Paradise includes

640-by-480 and 800-by-600 gr ivers as well as 132-by-25 and 132-by-43 text drivers. Special drivers earn a very good score. Documentation for the Profession in a more finished form than the Paradise VGA Plus 16's manuals, but the text is almost identical. There are two many one covering software drivers and the

other covering the installation and use of the board. Guidelines for installing the Professional are detailed and geared for the govice user. There is a detailed troubleshooting section, clear DIP-switch instructions, a table of contents, and a helpful glossary. There is no quick-reference guide or index with the manuals. Documentation

earns a satisfactory. Paradise includes several small software utilities with the Professional: a standard mode-switching program, a DM date ROM check to test a system's R RAM BIOS for speeding up BIOS access. a 16-bit test utility, and several fosts for

programmers.
Setup and ease of use for the Professional are standard. Both categories earn a good score. The layout and design of the Profes-

sional is very clean. We found oo added wiring or components. The board uses primarily surface-mount technology There is one set of four DIP switches. accessible from the front of the board. and the 15-pin video connector. We rate

workmanship very good. A three-year warranty for the Professional outs some icine on this impressive performer. Paradise also offers a threeyear VGA software comoutibility guaran-

If the board does not work with any VGA software that runs with an IBM VGA display adapter. Paradise will repair the board or refund your money. There is a technical support line available from 7 a.m. to 5 o.m. Pacific time: the call is oot toll free. We rate support policies very

We got through fairly quickly on each call. For the most part, the technicians were courteous and heloful, providing us with correct answers to our questions However, on one call a technician ran short of nationce when we asked a novice question. On balance, we rate technical

support good.

The Professional offers solid features and performance but its \$799 price tag is the second highest of the 512K boards. In comparison, a Fastwrite with 512K of memory costs \$758 and the Tecmar PRODUCT SUMMARY

Paradise VGA Plus 16 wyr. Western Digital Imaging, Para dise Systems Inc., 800 E. Midd

Road, Mountain View, CA 94043; (415) 960,7360 Het Price: \$400 /2569 Chare drivers: Autocod: Lotus 1-2-3: ndows 2.0

Secal res dies: 640 by 400 (256 colorsi: 800 by 600 (16 colorsi: 132-Chip set: Par and size: 16-bit: full length. ert: Three-year warrants

es: inexpensive. Semmant: A 256K RAM board with solid oformance, low price, and many soft ware drivers.

VGA/AD with 512K costs \$695. On balance, price and features combine for a

Paradise VGA Plus 16

Paradise's VGA Plus 16 is essen identical to its sibling, the Professional with the exception of its 256K of RAM The board runs off of Paradise's own chip We had oo troubles runs

software suite on the Plus 16. The board performed well and earns a solid excellent in software compatibility. With Hercules, MDA, CGA, EGA, and VGA resolutions, including 320 by 200 pixels in 256 simultaneous colors, the

Professional meets our basic resolution requirements. The Plus 16 also runs in -column text resolutions, 640 by 400 io 256 colors, and 800 by 600 in 16 colors. Resolution for the Plus 16 earns a very good score.

Across the board, the VGA Plus 16 came in with standard speed test times although it was a bit slow running Autocad with its 80G-by-600 ADI driver. Speed earns a satisfactor Drivers for the VGA Plus 16 include

Windows 2.0 drivers with 640 by 480 pixels in 16 colors, 640 by 400 in 256 colors, and 800 by 600 in 16 colors (There are no Windows 386 drivers.) For Autocad. Versions 2.x and 9 there are 800-by-600 eight-color drivers. For Autocad. Version 2.x Paradise also ships a 640-by-480 eight-color driver. For otus: 1-2-3 there are 640-by-480 and 800-by-600 graphics drivers and 132-by 25 and 132-by-43 text drivers. Special

drivers earn a good. Documentation for the Plus 16 was not in traditional Paradise form, but the text is almost ideotical to the Paradise Professional's manuals. Two manuals are provided, one covering software drivers and the other covering general use and installation. Installation instructions for novices are well-detailed. There is troubleshooting section, DIP-switch chart, and table of contents. There is no index or quick-reference guide with the

manuals. Documentation is satisfactory. Paradise includes the same software with the Plus 16 as with the Professional There is the standard mode-switching ram, a ROM check to test a system's ROM date, RAM BIOS for speeding up BIOS access, a 16-bit test utility, and

several foots for programmers Installing the VGA Plus 16 requires setting the four DIP switches, then dropping the board in. We encountered

no difficulties in either setup or ease of use for this board. Both categories earn good scores We found no workmanship flaws on the VGA Plus 16. The board has solid design and layout, with an IBM features coopector and a 15-pin video connector. Like most boards in this comparison, the VGA Plus 16 has primarily surfacemount components. Workmanship earns

a very good

Paradise offers a three-year warra and a three-year VGA software comp bility guarantee on the VGA Plus 16. Technical support is free, although the call is not. Support bours are 7 a.m. to 5 p.m. Pacific time, Monday throu Friday. Repairs are handled directly through the company, with a promised five-day turnaround time (not including shipping). There are no extended warran ties or support plans. Support policies

earn a very good score We had oo difficulty getting through on Paradise's technical support line. As we mentioned, technicians were courte-ous and helpful providing us with correct answers to our questions - though on one call a technician ran short of patience when we asked an overly simple question. On balance, technical support earns a

At \$499, the VGA Plus 16 is the second-lowest-priced 256K board in this parison, \$100 below the other two 256K boards, Compaq VGC and Video Seven Fastwrite, With its slew of software drivers and solid perforance, the VGA Plus 16 is a good value.

# Tecmar VGA/AD

Tecmar's contribution to the 16-bit VGA pack is the VGA/AD. Introduced in May 1988, the VGA/AD is based on the Tsene Labs chip set and features full EGA and VGA resister compatibility. The VGA/ AD is packed with 512K of video memory, giving it a dazzling top resolu-tion of 1.024 by 768 (non-interlaced).

The VGA/AD was almost flawless in ar software compatibility tests. We ran Paintbrush and Microsoft Word under DOS 3.3, and Rbase under OS/2 We had some difficulty running Lotus 1-2-3 with Tecmar's RAM BIOS utility software. This utility locked up the er Windows or when viewing a Lotus graph in CGA mode. All of these problems disappeared when the RAM

### PRODUCT SUMMARY

Tecmar VGA/AD save Tecmer Inc., 6225 Cochran Road, Solon, OH 44139; (216) 349-List Price: \$695.

rare drivers: Autocad: Fastcad GEM: Lotus 1-2-3 and Symphony: Van tura Publisher: Windows, Versions 1.01 and 2.0: Wordstar 3.2, 3.3, and Profes-Additional resolutions: 540 by 480 and 800 by 600 (256 colors): 1,024 by 768

(16 colors): 132-column text. Chip set: Tsong Labs. Board size: 16-bit: full length. port: Two-year warranty Pres: 15- and 9-pin connectors; very low price for a 512K board; extensive high-

resolution drivers; fastest at Autocad. Coos: Sigwest in Word speed test Summary: Fine performer offers too resolution at a reasonable price

BIOS was removed from the system. Due to this small difficulty, compatibility rates oo higher than very good. The Tecmar board supports all the commoo video display modes in Hercu ies, MDA, CGA, EGA, and VGA. It also supports 10 extended VGA modes. VGA/AD can produce up to 1,024 hy 768 pixels io 16 colors or up to 800 by 600 pixels in 256 colors. Its text mode can

output up to 132 columns by 60 rows. Resolutioo rates an excellent. Io our VGA speed tests, the VGA/AD oduced scores generally below par Although it was the fastest video board wheo performing our Autocad ADI redraw test, the Tecmar was by far the slowest in our Microsoft Word scroll test. On all other speed tests it placed oear the bottom of the pack. Nevertheless, be cause Tocmar's average speed is not significantly different from the others, the VGA/AD still earns a satisfactory rating.

Tecmar provides a selection of special ideo drivers on three 54-inch floops disks. Included are drivers for Autoc Wordstar 3.2 and 3.3. Wordstar Profesal. Fastcad, GEM, and Veotura Publisher. There are also drivers for Microsoft Windows, Versions 1.01 and 2.0. and 132-column text drivers for Lotus 1-2-3 and Symphony. Missing from the bunch are high-resolution drivers for Windows 386 and Lotus graphics. Tecmar states that these are in produc tion and due out sooo. The Tecmar board

earns a good for special drivers.

Tecmar's VGA/AD documentation in unattractive but complete. The user guide is three-hole punched and sized to fit an IBM-style documentation binder. Unfortunately, the glued binding makes it impossible to leave it open to a particular page. There is a table of cootents, and clear, and the type foot is large and easily read. The installation description should be sufficient for less experienced users and there are helpful diagrams describing the DIP switches and jumpers. Tecmar also provides a smaller sup-

lemeotary document covering the iostal latino of the video board in various brands of computers. About two-thirds of the manual covers installing the utility software and application drivers. These descriptions are rather brief and assume the user is familiar the application's installation procedures

The user guide has one major omission: a troubleshooting chapter. The best it offers is a short question-and-answer section oo driver installation. The manual has some features you expect but frequently do not find. You do not have to hunt for the technical support number, service procedures, or warranty information. They are all found on the last page of the book. Documentation rates a good. Several software utilities also come on the floppy disks. The Rambios.com transfers the video ROM into the system RAM. A very useful utility, Vga.exe, brings up menus for setting text modes. graphics modes, selecting the monitor, or

displaying driver installation help.

As with all the VGA boards teste Tecmar VGA/AD is easy to install and use. It can be installed in either an 8-hit or 16-bit slot, hut you lose any speed advan-tage with an 8-bit slot. The board autoically switches from VGA to EGA or CGA graphic modes, depending on software control. The video DIP switches are located in the board's mounting bracket and can be set without open computer. Technia's VGA/AD is dis video adapter to still provide a 9-pin connector. This enables two monitors to be connected at the same time. Setup and esse of use both rate a good.

Tecmar's workmanship is first-rate. The components are well-laid-out and there is no evidence of last-minute changes. The 512K memory is soldered in rather than socketed, improving its reliability. Unlike the other video adapters, which cootain mostly surface-mount components, Tecmar's board has only two. This does not reduce the board's

quality hut reflects less-than-cutting-edge technology. Workmanship is very good. Tecmar offers a two-year warranty. This is shorter than Video Seven's five years and Paradise's three years. Service is indled by Tecmar, and it claims to offer 48-hour turnaround the first six months of the warranty. After six mooths, the average service time is one week. As with most video boards. Tecmar does oot have extended warranties or support plans. There is a support bulletin board available for technical questions and recently released drivers. Tecmar's technical support is free, as is the call, Support hours are Mooday to Friday 9 a.m. to 9 p.m. Eastern time. The two-year warra

extended hours, toll-free line, and BBS ip earn support policies an excellent.

In our technical support calls we got through quickly and the technicians were friendly and fairly helpful. Unfortunately, oo one was able to answer our 1-2-3 lockup problem with confidence, and they did oot ask the sort of question needed to solve the problem. Technical

ort rates a satisfactory The VGA/AD retails for \$695. This is the second-lowest price for a 512K box vet it offers almost as much as Video Seven's V-RAM. On the other hand, among high-speed VGAs the VGA/AD in Word graphics is closer to the tortoise than the hare, but for Autocad it flies. The dual monitor connectors are a plus. On balance, we rate its value good.

# Video Seven Fastwrite The Fastwrite is one of Video Seven's pair

of 16-bit boards released in July. It offers full IBM-register compatibility, an optioo of 256K or 512K RAM, and a memoryeaching feature. The board sports Video Seven's new V7 chin.

The Fastwrite had no trouble with our software compatibility suite, including Microsoft Windows 386 and OS/2. It earns an excellent in this category.

The Fastwrite offers resolutions star

# dard to many extended VGA boards PRODUCT SUMMARY

Video Seven Fastwrite

Company: Video Seven Inc., 463/35 Landing Parkway, Fremont, CA 94538; (415) 656-7800. Fiet Price: \$500 (2500) DOAM (Incresse

Software drivers: Autocad; Autosi Lotus 1-2-3; Windows 2.03 and 386. Additional resolutions: 640 by 400 (256 colores: 800 by 600 and 720 by 540 (16 colors); 132-column taxt. With 512% of RAM, 640 by 480 (256 colors); 1,024

cours \$1500

by 768 (two or four colors). Chin set: Video Seven Board size: 16-bit; full length. ort: Five year warranty. ranty; extensive high-resolution drivers.

Pres: Upgradable to 512K; super warese Expansive as a 250K board, pour technical support.

mary: A solid full-feature perfo that suffers only from inexpensive com-

# BENCHMARK CHART

# 16-Bit VGA Boards

Product	(ADI)	(as IBM VGA)	Word 4.0 (graphics)	Word 4.0 (text)
Compaq VGC	N/A*	6	30	9
Hewlett-Packard VGA	13	5	27	6
Paradise V&A Professional	12	6	27	8
Paradise V&A Plus 18	12	6	27	8
Tecmar VGA/AD	6	6	44	6
Video Seven Fastwrite	9	6	27	8
Video Seven Y-RAM	8	6	21	8

With just 256K, the board will support all VGA modes up to 320 by 200 and 640 by 400 in 256 cole ers, and both 800 by 600 and 720 by 540 to 16 colors. Adding 256K of DRAM to the Fastwrite add support for 640 by 480 pixels in 256 colors, as well as 1,024 by 768 in two or four colors. (The 1,024-by-768 resolution is oon-interlaced.) Its enhanced-VGA resolution earns a very good score. In our speed tests the Fastwrite was a solid performer, often with times slightly above average. However, its overall speed

was oot significant enough to raise it above the standard score of satisfactory. The Fastwrite provides many 800-by-600 and 720-by-540 drivers in limited colors, but there is just one driver for 256-color resolutions. The Fastwrite has two 132-columo drivers, a 720-by-560 driver. and an 800-by-600 driver for Lotus 1-2-3. There are also drivers for Windows ersions 2.03 and 386 and Autocad io 720-hy-540 and 800-by-600 resoluti Video Seven is unique in supplying a 640-hy-400. 256-color driver for Autoshade.

Special drivers earn a very good. Documentation consists of both hardware and software manuals. There are clear installation instructions for povices and a quick-start section for experienced video card users. Clear but simple diagrams accompany the text. There are also charts displaying the DIP-switch settings. Troubleshooting information for the boards is pretty slim — a oine-step procedure to follow before calling technical support and two question-and-ansy

paragraphs. Vidoo Seven iocludes a table of contents and a helpful elossary of video terms. There is on index for either manual, Documentation earns a good score. There are several software utilities shipped with the Fastwrite board, including diagnostics, a screen saver, a ROM date check, a clear-screen utility, a

directory-listing utility, and an Ansi.svs file to use with enhanced-text modes. Setting up the Fastwrite is easy. Set the DIP switches for your monitor and drop the board ioto a slot. Once installed, the board needs virtually no attention. Modes are set automatically, or you can control them from the keyboard. We rate both setup and ease of use sood.

We found only one resistor added to the back of the Fustwrite. Aside from this. the board is very clean. The Fasty thio - designed more like a PS/2 board with an IBM edge-style features nector and an analog-only 15-pin video concector. All components are surface mounted. The Fastwrite earns a

y good in workmanship. Video Seven offers an amazing fiveear warranty on the Fastwrite (as well as the V-RAM). Repairs are handled through Video Seven. The Fastwrite also

has a compatibility guarantee for all VC software, including OS/2. The compa offers a BBS for additional prod nformatioo. Video Seven provide limited, toll-free technical support Moo-day through Friday from 8 a.m. to 5 p.m. Pacific time. Support policies earn a

We had considerable trouble getting rough on Video Seven's line. On many calls it was busy, and each time we got through, we had to leave a message. We put in over 10 calls to Video Seveo's technical support line over a period of about 10 days, but oever got through to a technicism. Only one call was returned and, although we received good help on this call, the other unreturned calls can't be excused. We were assured at the time of our earlier review (October 10, 1988. Page 79) that technical support would

improve, but we must assio rate it poor With 256K of RAM the Fastwrite sells for \$599 — \$100 more than its close competitor, the Paradise VGA Plus 16. With the upgrade to 512K (total cost \$758) the Fastwrite is a better value, the third-lowest-priced board in that category. Extended resolutions, 16-bit performance, a wide array of drivers, and the five-year warranty make the Fastwrite a very solid board. We rate it a good value.

# Video Seven V-RAM VIDEO SEVEN

The boost in Video Seven's high-end 16bit board comes in its specialty video RAM chips. Video RAM, or dual-ported dynamic RAM, allows video information to be processed faster because while data is being written to the screen further data can be transmitting from the system's CPU Standard DRAM communicates

through a single port, so it can be slower. The V-RAM passed our compatibility ite with flying colors. Performance with Windows 386 and Microsoft OS/2 iodicated full register compatibility. Software compatibility rates an excellent.

Offering all of Fastwrite's resolutions and then some, the V-RAM goes beyond oormal VGA-resolution harriers. With 256K on-board, the V-RAM provides 640 hv 400 io 256 colors, 800 hv 600 and 720 by 540 io 16 colors, and 1,024 by 768 io two and four colors. Brioging the board up to 512K adds 640 hy 480, 720 by 540. and 800 by 600 in 256 colors, and 1,024 by 768 in 16 colors. All 1.024-by-768 resolutions, which are non-interfaced. require high-resolution variable-freq

monitors such as the INEC Muldisync

XL. Resolution is excellent Although we ran extensive tests, spe differences were not areat with any of the boards tested, except for the V-RAM.

# The Experts Know Where To Find A Good Deal.



Heading a full line of competitively-priced 386 and 286 portable and desktop computers from the company where one-day service is never a problem. Reliability is the key word for Micro Express products. All Micro Express PC's are burned in for at least 72 hours to eliminate infant mortality problems. Further, a one-year warranty is provided on parts and labor.

Modei	Standard Unit	With Monothroner Card and Monitor	With EGA Card and Monitor	With VGA Card and Monitor	100 M25 Hard Disk Upgrade	Upright Case
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296-20 Desistop	*3899	5040	200	2749	5001	500
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DESKTOP COMPUTERS MF 386-20 □ 80386 processor running at 20 MHz

- ☐ 1 MB of RAM upgradable to 8 MB on same board
- ☐ Zero wait state operation
- ☐ Socket for 80387 math co-processor □ One 32-bit expension slot
- ☐ Five 16-bit expansion slots ☐ Two 8-bit expansion slots
  - □ 1.2 MB floppy disk drive ☐ 40 MB fast access hard disk
  - (up to 380 MB available) ☐ Serial and parallel ports
  - ☐ 101-style keyboard

# ME 286-20

D 80286 Processor running at 20 MHz ☐ 1 MB of RAM upgradable to 8 MB on Main Board □ Zero Wast State Operation on Memory

□ Page Mode Interleave Memory D LIM (Lotus-Intel-Microsoft) 4.0 support for Memory over 1 MB

☐ Socket for 80287 Math Co-processor ☐ Real Time Clock/Calendar with CMOS RAM and Battery Back-up □ Microsoft DOS and OS/2 compatible

☐ High Performance NCL Floppy/Hard Disk Controller\* C 1.2 MB Ploopy Disk Drive

(1.44 MB or 36(K options at no extra cost) ☐ 40 MB Fast Access Hard Disk (up to 38) MB available)

☐ Serial and Parallel Ports □ 101-Style Keyboard COne Year Warranty on Parts and Labor For Each Additional Mog of RAM Add 8450

# ME 286-12

□ AT-style Keyboard

□ 80286 Processor running at 6/12 MHz □ S12K Memory on Main Board (upgradable to 1 MB)

□ Zero Wait State optional □ 8 I/O Expansion Slots

□ CMOS Clock/Calendar Circuit ☐ Socket for 80287 Math Co-Proces □ NCL Floppy/Hard Disk Controller\* (SCSI optional) □ 1.2 MB Floppy Disk Drive

# PORTABLE COMPUTERS

# Regal II (Gas Plasma Display) \$3999

□ 80386 Processor running at 20 MHz ☐ 1 MB of RAM (Expandable to 10 MB

using Piggy-Back Board) □ Zem Wait State Operation

□ 64K of Cache implemented with 35/40ns Static RAM □ Socket for 80387 Math

Co-Processor □ Norton S1 Rating of 23 D AMI Bios with Set-up and Diagnostics in ROM

□ 640 x 400 Super High-Resolution Gas Plasma Display

□ 9) characters x 25 lines ☐ Software Switch between Monochrome or Color Graphics Softwares and Mono, Color, EGA or Gas Plasma Scr

☐ High Performance NCL Floppy/Hard Disk Controller® D 1.2 MB Flopov Disk Drive (1.44 MB or 360K Free Replacement option)

(90 MB Fast Access Hard Disk (90 MB optional) ☐ Serial and Parallel Ports ☐ Ports for External Monochrome, Color or

FGA Monitor ☐ Will Run Color Softwares on EGA Monitor □ One Available Slot

□ 12-function Keyboard For 80 MR Hard Disk Add 8500



# Regal (Gas Plasma Display)

☐ 80286 Processor Running at 20 MHz II 1 MB of RAM progradable to 8 MB on Main Board

☐ Zero Wait State Operation □ Page Mode Interleave Memo □ LIM (Lotus-Intel-Microsoft) 4.0 Support for

Memory over 1 MB □ Socket for 80287 Math Co-Processor □ Real Time Clock/Calendar with CMOS

RAM and Battery Back-up □ Microsoft DOS and OS/2 compatible □ Five Expansion Slots (3.16-bit, 2.8-bit) Two Available: 1 16-bit, 1 8-bit

□ 640 x 400 Super High-Resolution Gas Plasma Display □ 80 Characters x 25 Lines using Software Switch between Monochrome or Color Graphics

and Monochrome, Color, EGA or Gas Plasma Screens ri High Performance NCL Flopow/Hard Disk Controller\*

□ 1.2 MB Floppy Disk Drive (1.44 MB or 360K optional at no extra cost) ☐ 40 MB Fast Access Hard Disk

(up to 38) MB available) O Serial and Parallel Ports □ 12-function Keyboard ☐ One Year Warranty on Parts For 50 ME Hard Disk Add 850

and Labor

# Roadrunner Plus

□ 80386 Processor running at 20 MHz □ I MB of RAM (Expandable to 10 MB) using Piggy-Back Board □ Zem Wait State Operation

☐ 64K of Cache implemented with 35/40ns Static RAM □ Socket for 80387 Math Co-Processor

□ Norton S.I. Rating of 23 CALL TOLL-FREE: ☐ AMI Bios with Set-up and Diagnostics in ROM □ 640 x 400 High-Resolution Liquid Crystal Display

□ 11-inch Screen, 80 Characters x 25 Lines ☐ Port for External Monochrome, Color, or FGA Monitor

□ Will Run Color Softwares on EGA Monitor □ Two Available Expansion Slots

(Both Long 1 16-bit, 1 8-bit) □ High Performance NCL Floppy/Hard Disk Controller

☐ 1.2 MB Floppy Disk Drive (1.44 MB or 360K Free Replacement option) I 40 MB Fast Access Hard Disk

(80 MB Available) ☐ Serial and Parallel Ports □ 12-function Keyboard Day 50 MS Hard Day Add 9700

# Roadrunner

CI 80296 Processor running at 12 MHz S12K of RAM Upgradable to 1 MB on Mein Board □ Zero Wait State Operation (optional)

□ Socket for 80287 Math Co-Processor ☐ Real Time Clock/Calendar with CMOS RAM and Battery Back-an □ Microsoft DOS and OS/2 Compatible

□ 640 x 400 Super-Twist Liquid Crystal Display □ 11-inch Screen, 80 Characters x 25 Lines. ☐ Six Expension Slots

Available: Two Long, One Short ☐ High Performance NCL Floppy/Hard Disk Controller 12 MB Flooov Disk Drive

(1.44 MB or 360K options at no extra cost) □ 20 MB Fast Access Hard Disk (40MB or 80MB also available) C Serial and Parallel Ports

□ Ports for External Monochrome or Standard Color Display □ 12-function Keyboard

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# REPORT CARD

# 16-Bit VGA Boards

	(InfoWorld weighting)	(Your weight	ing	Compaq	Hewlett- Peckard YGA	Paradise VQA Professional	Paradise VQA Plos 18	Tecmer VQA/AD	Video Seves Fastwrite	Video Seves V-RAM
Performance										
Compatibility	(200)	- (	)	Excellent	Excellent	Excellent	Excellent	Very Good	Excellent	Excellent
Resolution	(50)	_ (	)	Good	Very Good	Very Good	Very Good	Excellent	Very Good	Excellent
Speed	(50)	- {	)	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Setisfactory	Satisfactory	Good
Special drivers	(50)	(	)	Poor	Poor	Very Good	Good	Good	Very Good	Very Good
Documentation	(50)	- (	)	Good	Good	Satisfactory	Satisfactory	Good	Good	Good
Setup	(50)	- (	)	Excellent	Good	Good	Good	Good	Good	Good
Ease of use	(150)		)	Excellent	Good	Good	Good	Good	Good	Good
Serviceability										
Workmanship	(40)	- (	)	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good
Support policies	(20)	(	)	Poor	Poor	Very Good	Very Good	Excellent	Excellent	Excellent
Technical support	(40)	- {	)	Poor	Unacceptable	Good	Good	Setisfactory	Poor	Poor
Value	(300)	- (	)	Poor	Satisfactory	Good	Good	Good	Good	Satisfactory
Fistal scores				6.2	6.1	7.0	7.0	6.7	7.0	6.8
Use your own weightings										

to calculate your score

## QUIDE TO REPORT CARD SCORES

bWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to escellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each ordenon by its rating, where - Outstanding in all areas ry Good = 0.75 — Meets all essential criteria and offers significant adv

 d = 0.825 — Meets essential criteria and includes some special features. actory - 0.5 - Meets essential criteria.

This board was significantly faster than the competition in our Word 4 graphics mode test. It also came in at or near the top of the pack in our other speed tests. sile we still have not found any other real-world applications that show major differences in relative speed among VGA pards, the results of the Word 4 and Autocad tests earn the V-RAM a good

The V-RAM offers the same drivers as its sibling, the Fastwrite. There are two 132-colu mn drivers, a 720-by-540 driver. and an 800-by-600 driver for 1-2-3. There are also drivers for Windows. Ve

## PRODUCT SUMMARY

# Video Seven V-RAM Company: Video Seven Inc., 4633S

ng Parkway, Framont, CA 94538: (415) 656-7800 List Price: \$799 (256K ORAM upgrade

costs \$299). twere drivers: Autocod: Auto Lotus 1-2-3; Windows 2.03 and 386. Additional resolutions: 640 by 400 (256 colorsic 800 by 600 and 720 by 540

(16 colors): 1,024 by 758 (two or four colors): 132-column text, With 512K of RAM, 640 by 480, 720 by 540, 800 by 600 (256 colors); 1,024 by 768 (16 col-Chip set: Video Saven

Board size: 16-bit; full length. west: Five-year warranty. Pres: Multiple software drivers: upgradable to \$12%; super warranty; Vided RAM- extensive high resolution drivers; fastest overall board. Cons. Most expensive; poor technical

support. mary: A leading edge board that suffers from the competition's lower orices.

2.03 and 386 and Autocad in 720-by-540 and 800-by-600 resolutions. Video Seven is unique in also supplying a 640-by-400 256-color driver for Autoshade, Special The V-RAM's hardware manual and

oftware manual also closely match the books for the Fastwrite. There is a quickstart guide for experienced video board users, guided installation instructions for novices, a table of contents, and glossary Diagrams and DIP-switch charts match the actual hardware and adequately aid installation. There is some minimal troubleshooting information - points to cbeck before calling technical support and two question-and-answer paras There is no index in the manuals. This

basic documentation earns a good score Included with the V-RAM are these ities: diagnostics, a screen saver, a

ROM date check, a clear-screen utility, a directory-listing utility, and an Ansi.sys file to use with enhanced text modes. Setting up the V-RAM is identical to Video Seven's Fastwrite. Just set the DIP

switches and press it into a slot. We rate both setup and ease of use good. The layout and design of the V-RAM is very clean, with all surface-mount components and no added wiring. The board is a thin, PS/2 style with an IBM

edge-style features connector and an analog-only 15-pin video connector There was one small resistor added to the back of the V-RAM, but it was or secure. Workmanship for the V-RAM rms a very good.

For the V-RAM, Video Seven once

again offers its incredible five-year warranty. In the changing video board field, that is basically the lifetime of the board. The V-RAM is also backed up by a npatibility guarantee for all VGA software. Video Seven offers cost-free and toll-free technical support and a BBS for additional product information. Hours are Monday through Friday from 8 a.m.

Page = 0.25 - Eats short in assential source Beasceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to infoWorld readers involved in purchasing and using that product category. You can customize the report card to you company's needs by using your own weightings to calculate the final score.

to 5 p.m. Pacific time. All repairs are bandled through Video Seven, Support policies rate an excellen

As we mentioned in the Fastwrite ion, we put in over 10 calls to Video Seven's technical support line over a period of 10 days. Despite our efforts we never did get through directly to a technician. We left messages, after spending five minutes on bold each time, but only one call was returned. The help we received from the one return call was satisfactory, but it does not offset the frustration of the other nine attempts. We must rate support poor.

and similar features bring the score down to satisfactory

# **Executive Summary**

Ithough vendors tout speed as a hig VGA selling point, with two exceptions we can't show it to be significant. Video Seven's Vsignificant. RAM earns the highest score in speed, but all the boards offer impressive

Four boards offer similar values. Tecmar's VGA/AD offers a fine nackage, with 512K of RAM (for the highest combination of resolution and colors) at a price that's second lowest in its category. It has many high-resolution drivers and offers both 9- and 15-pm connectors for monitors. It was both the quickest performer in our Autocad and the slowest in our Word

. It also had a graphics-mode test roblem running its RAM BIOS. Other good values are Video Seven's Fastwrite and Paradise's boards. Video Seven's Fastwrite has a virtual lifetime warranty (five years), very good drivers. and is upgradable to 512K. It does bowever, suffer from poor technical support. Paradise's VGA Plus 16, a solid 256K performer, is \$100 less than the Fastwrite and offers good drivers but doesn't offer the upgrade capability Paradise's warranty is for three years. Paradise's VGA Professional is a strong good drivers and a three-year warranty but it's more expensive than either the Video Seven's V-RAM represents.

For a full 512K V-RAM you'll hand

over \$1,098. A 256K board is a bit more

reasonable at \$799, but still out of the

league of the rest of the competition

With its video RAM allowing faster speed

and higher resolutions (such as 1.024 by

768) and colors, the V-RAM VGA is on

the cutting edge of VGA technology. The

entrance of several other low-cost 512K.

boards puts considerable pressure on the

V-RAM's relative value. In our October

review, the V-RAM rated a good value,

but now the competition's lower prices

the state of the art in video RAM, but it has a price to match. As a 256K unit, it costs \$200 more than its sibling Fastwrite: and as a 512K board, it costs a formidable \$1,098. It is the fastest performer we tested, but also suffers om poor technical suppo

Hewlett-Packard's VGA is the least expensive 512K board and is a fine but undistinguished performer that has few drivers. We couldn't find any dealers who cared to help us with technical

Compag's Video Graphics Contro

ler is a 256K board that's easiest in setup and use, but carries a high price, offers no drivers, and also sends you to

# PRODUCT COMPARISON

# 2,400-BP **ERROR-CORRECTING**

# MODE

# InfoWorld puts ten to the test

BY STEPHEN SATCHELL DIRECTOR OF HARDWARE TESTING AND MIKE HILDUM INFOWORLD TEST CENTER

hether you're reading the latest information from Dow Jones or sending sales quota reports from your remote office to your home office 2,000 miles away, you'll want a modem that's fast and reliable.

When we surveyed our readers, we found that the great majority are now purchasing modems that operate at 2,400 bps. This isn't surprising since the newer 9,600-bps modern marketplace is still in a state of flux - struggling over communication standards and pricing.

We therefore look at the more mature 2,400bps arena in this comparison. We evaluate 10 such modems, nine of which include built-in error correction (such as MNP - Microcom Network Protocol). The one exception is the Haves Smartmodem 2400, the market's domi-

nant product, which we include as a baseline for contrast. (We also review the Hayes V-series Smartmodem 2400, which does include MNP error correction.) Although these 10 modems aren't awesomely

fast, they are reliable enough, in most cases, to transmit data without making modem communications a nuisance. Along with built-in error correction, five of the modems in this comparison feature MNP Level 5 data compression, which allows the modem to transfer data faster than the 240-character-per-second limit.

Judging from the modems we looked at, price doesn't always define speed or reliability. Because of the commodity nature of 2,400-bps modems, you can't assume that a higher-priced modem will offer you any more features than a lowerpriced modem; careful shopping is required. One thing is for sure, though: 2,400-bps modems can be expected to dominate the modern marketplace

# for some time to come. AT&T 2224 CEO

Years ago the Bell Operating Company (BOC) rented modems as well as phone service. Today you can buy a Bell-designed modern direct from AT&T; the 2224 CEO is the latest version of the Dataphone II 2224. Bell Labs has done a wonderful job of incorporating standards including the AT command set as defined by Hayes, the CCITT modulation methods (v.22 and v.22 bis), and all the features modem buyers demand. The AT&T modem implements MNP error correction up to Level 4, stopping just short of providing data compression.

In our performance testing, the AT&T modem transferred data error-free, as expected, over all but our worst connections. In answer mode the AT&T modem performed at a rate of 181 characters per second, earning a satisfactory score. Origination mode performed slightly faster at 194 cps, bumping its score up to good.

AT&T provides outstanding documentation, suitable for novice and expert alike. Features we found most helpful include complete troubleshooting guides, a table of contents, index, glossary, and a quick-reference card. The flawless documentation is awarded an excellent rating.

AT&T has put the setup switches on the front panel of the modem. In addition, the front-panel reset button makes any configuration changes take effect immediately. Many options can also be set up via software commands and saved. Overall, we found setup to be very good

A front-mounted volume control lets you select the sound level from the speaker, this is handy because you can easily adjust the speaker volume as office noise level changes. Like most AT&T modems, there is no power on/off switch. When your computer is running, so is your modem. Although this might be unsettling for users who are paranoid about leaving equipment on, it's not a problem in most shops; many

# PRODUCTS REVIEWED

58

63

62

AT&T 2224 CEO... Black Box 2400 HC ... Everex Evercom 24E+ ..... Haves Smartmodem 2400 ..... Hayes V-Senes 2400.... Microcom AX-2400c.... Multitech Multimodem 224E. 60 Racal-Vadic Maxwell 2400VP. .... 61 U.S. Robotics Courler 2400e ... Ven-Tel 2400-33 .... InfoWorld Rebort Card... Executive Summary.....

## PRODUCT SUMMARY



# 2224 CEO am; AT&T, 295 N. Mople Ave.

Basking Ridge, NJ 07920; (800) 635-List Price: \$695 ert: Two year warranty Pres: MNP Level 4: front-mounted speaker volume control: outstanding documentation; provides good value. Cons: No power on/off switch

Summary: Well-built modern offering. experts prefer to keep comp ment running around the clock. Ease of The design of the 2224 CEO is good.

midrange performance.

use is very good

with surface-mount components keepi the bulk and heat down. Although we weren't as impressed with the soldering job, there were no apparent patches or fixes. Balancing the modem's quality design with its satisfactory soldering, we award workmanship a very good rating. The modern features a two-year warranty, with a number of warranty options available. AT&T's technical support number is toll from Support policies are

While we bad to leave a message each time we called technical support, all our calls were returned in about an hour. The support staff answered our questions but didn't volunteer any additional informa-

tion. We rate technical support satisfactors The AT&T 2224 CEO is easy to set up, ugh performance is about average. At \$695, the AT&T modem is a bit expen-

# sive. Nevertheless, the modem's quality construction makes it a good value. Black Box 2400 HC

BLACK BOX CORP. Black Box Corp. makes one-stop shop-ping easy with its catalog stocked full of

low-priced telecomm nt. We selected the Black Box 2400 HC modem. The Black Box 2400 HC offers MNP error correction at Level 4. The 2400 HC is a better-than-average

modern at sending and receiving data. In our worst-case test for answer mode, the Black Box modem succeeded in transmit ting at 228 cps, resulting in a very good swer score. When placing the call, the 2400 HC performed slightly lower, at 19 cps, earning a good score for originate. If you buy the 2400 HC modem, be prepared to play guessing games. The documentation is easily the worst we've seen - ranking at the bottom of this comparison and possibly of any PC

modem we've reviewed. Not only is the manual badly written and poorly reproduced, it is lacking in many areas. For example, there is no troubleshooti section and a sparse table of contents. On whole, its only useful function is providing installation instructions for novices, there is no quick-reference card to get experts up and running quickly. In its present state, we rate documentation

Some modem opt DIP switebes, which are all labeled on the rear of the modem. The remaining ontions are set via on-line commands

Because the modem is fairly easy to set up, we rate it satisfactor The front-panel indicators show evcrything you want to know about what's happening between the computer/ter-minal and the modern. However, the indicators could be made a bit easier to

distinguish; they are all the same color and are directed upwards, making them difficult to see in some installations. Ease of use is satisfactory. At first glance, we were less than impressed with the mechanical design of this modem. The case is made of thin plastic and seemed susceptible to easy

breakage or cracking. When we simulated a fall from the top of a computer, the internal speaker came loose; all other components remained intact. There are no anti-skid feet to keep the Black Box modern in place, making a 30-inch drop to the floor all the more

When we opened the case for ins tion, we found sloppy construction. For instance, many of the chips were not nested correctly into the board, components were bent and twisted, and the solder job was less than perfect. Because the modern didn't break down during our testing, we can rate it no lower than poor in workmanshin.

# How We Tested and Scored 2.400-BPS Modems

for this comparison, we created a telephone simulator to duplicate phone line problems that are likely to occur when using a modern. A controlled environment is preferred because regular phone line conditions can vary greatly from call to call. Our simulator tests, based on extensive research available on phone line conditions from Bell Labs, allow us to select specific phone line conditions ranging

from the best to the worst case. To create this telephone environment, we connected two identical modems to an Intel 386/25 and then directly to our simulator via 6,000 and 4,000 feet of telephone wire pair. The actual simulator was made up of a pair of two-wire-to-four-wire bybrid transform line amplifiers, a Bradley Telco 2A-2B Hit-Jitter Synthesizer, and a Hewlett-Packard attenuator. These latter two devices let us insert known defects, or ments, into one side of the circuit for testing.

Each modem was tested as an originating and as an ring modern. Two sets of four tests, introd four levels of line impairment as defined by the Bell Labs 1982-83 Connection Study (the most current study to date), were performed. The first test mimicked "perfect" telephone call through a single central office. The remaining tests mimicked long-distance calls with three levels of impairment, including an average call, a difficult call (where the study shows that 75 percent of all calls are better), and a worst-case call (where the study shows 90 percent of all calls are better).

In each of the four tests, we transferred data, using a random-number generator in a test program, for two mioutes. In the first set of four tests, the modern acted as the originating modem, while in the second set of four tests the modern answered the call. During these test periods, the number of characters sent and errors encountered were recorded. When the modem ran into an error, the test program automatically waited for the line to become quict for one-balf second before continuing, simulating the typical procedure of well-designed file transfer software.

## low We Scored:

This product comparison uses an expanded report card designed to evaluate features and performance areas of greatest concern when selecting a modem. Things to look for include ease of setup, speed of operation, and reliability. For example, some modems require you to open the casing to set DIP switches. While this isn't too difficult for the seasoned user, many beginners will balk at this. When purchasing a modem, also consider whether it will be used primarily for originating or answering calls (we found speed of operation varies in each direction). If you can, tak to remove the craing.

This is where manufacturing or design flaws usually show up.

Performance: Speed: The scoring for this category was broken into two areas - answer and originate. One set of four tests was performed to test each area.

While the first three tests (best to difficult) are important, they are relatively uneventful, since an eptable modem easily passes these tests at a rate of 239 characters per second (cps). (One second is allowed for modem startup time.) If a modem performs at less than rated speed for our three less-severe tests, they are automatically dropped to a poor rating. In all cases, except for the U.S. Robotics Courier 2400E, the modems transferred the maximum number of cps in these tests. The worst-case test is where we begin to see some transmission-rate variations. When attempting to combat a severely impaired phone line, the actual capabilities of the modems become quite apparent.

A modem is rated satisfactory (in either answer or originate) if it can pass data error free at the rated speed of the modern in the local best case and the two lesssevere long-distance tests. In addition, the modem has to be able to pass data at or above 75 percent of rated ed (179 cps) in our worst-case test. At 80 percent (191 cps) or above the rated speed in the worst-case to with all other tests perfect, we award a good score. For performance at 90 percent (215 cps) of rated speed, a very good is carned, while an excellent is reserved for ems that transfer data at 100 percent (239 cps) of rated speed in all tests. No product in this come was awarded an excellent performance score. Performance ranged from 160 cps to 230 cps for our worstcase test, with the Multitech modern falling short of an excellent score (for answer mode) by only 9 cps.

# Documentation scores reflect the quantity and quality

of both written and on-line information. At a minimum, documentation should describe the product and bow to use it. Bonus points are awarded for a quickstart guide, an on-line tutorial and belp programs, a quick-reference card, and a written tutorial. Poor organization, missing information, or an incomplete index lower the score.

To score setup, we begin with a satisfactory score and award bonuses or minuses. If a product is quick to set up. DIP switebes are especially easy to set, or the cable connections are simple, bonuses are io order. If it takes ter incoding a terround of most, you can't casily styre the

DIP switches, configuration is difficult, or connections

are difficult to use, minuses may be appropriate. Essa of Use:

Like setup, ease of use is in large part a function of the product's design and evaluates bow easy the average user would find the modem in typical daily use. All but two moderns in this comparison support synchronous connections for micromainframe communication. This is particularly important to infrequent users who can't justify buying a special Bell synchronous 208-type modem. In-modem disgnostics (analog loopback and digital loopback in particular) are essential; this feature

was present in each modern we tested Other factors that can add to or detract from a sco include the quality and location of indicator lamps and ease of adjustments such as modern volume control.

Support is divided into three areas: workmanship. support policies, and technical support. For a satisfactory score in workmanship, the modern

must be of quality construction. When we open the case, for example, we shouldn't find solder patches or bent or flattened circuitry. Io addition, the outside modem casing should be solid ecough to sustain a bit of bumping around. If particular attention has been paid to either modern design or the actual manufacturing of the modern, bonuses are jo order,

For a satisfactory in support, we require a standard one-year warranty with unlimited (but not toll-free) telephone support. Bonuses are awarded for moneyback guarantees, free newsletters, corporate or extended support, bulletin board support (e.g., Compuserve), a toll-free number, and extended warranties. For a satisfactory in technical support, we must be

able to easily get through to a courteous, knowledgeable technical support person twice. Products get higher scores for in-depth product knowledge or support that goes above and beyond the call of duty, such as suggesting workarounds to problems, sending fixes, or other extras. Busy signals, being put on hold for long periods, and calibacks can lower a score.

Modems in this comparison are priced from \$370 to \$899. Each of the modems (except the Haves Smartmodem 2400) has built-in error correction (MNP Levels 3, 4, or 5 or LAP-B). In general, standard modern features don't vary, though speed scores range from poor to very good. Value scores reflect the price vs. the performance, features, and reliability of each product tened, odeny jaso see but the companion.

# E YOU

2400 BAUD

Introducing the PM2400SA. The intelligent, stand-alone modem with the stand-out price.

Our PM2400SA gives you all the very practical advantages of high speed data transmission...without having to mortgage the farm. In fact, we can't find another 2400 baud

modem to match our price. It's one heckuva deal!

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guaranteed100%Haves™compatible. And by "compatible," we mean User modifiable, non-volatile,

that even Hayes' own Smartcom II™ can't tell the difference. Again. Hayes compatibility is guaranteed...

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operation. · Automatic answer mode.

RAM stores configuration profile. . Pulse or touch-tone dialing.

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- · Automatic adaptive equalization
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MODEMS . BUFFERS . IBM & APPLE ENHANCEMENTS . INTERFACES

## PRODUCT SUMMARY



# 2400 HC

Company: Stack Box Corp., Box 12800, Philippingh, PA 15241; (412) 746-5500. List Price: \$375. Support: One-year warranty.

Pres: MNP Level 4: inexpensive; good performer. Cees: Sloppy design and construction; poor documentation; poorly placed indicator lights. Summary: A good performer that needs

some refning.

Fortunately, Black Box Corp. warrants its modern for one year. Support policies earn a satisfactory rating.

policies earn satisfactory rating.
When we called technical support, the longest we had to wait for a callback was 30 minutes. The technical support staff was quite helpful, taking up stome of the slack for the shoddy documentation and answering all our questions correctly. Technical support is very good.

At \$375, the Black Box modem is one of the two least expensive modems in this comparison. It offers quality performance and its technical staff is eager to help, but

rate the 2400 HC a satisfactory val-

# Everex Evercom 24E+ Everex's top-of-the-line 2.400-bos mo-

dem, the Evercom 24E+, offers the standard modern features and MNP Level 3, as well as a built-in speakerphone.

phone.

The 24E+ answered a call at 182 cps on the bad connection and originated a call at 187 cps, slower than some of the other modems in this comparison but certainly up to our standards. We rate the Evercom 24E+ statisfactory in both

categories.
The documentation provided setup instructions for novices, including plenty of diagrams and examples. A table of contents and an index belp you find information quickly. While there is no glossary or quick-reference card, the troubleshooting section was fairly com-

plete. Documentation for the Evercom 24E+ is rated good. To set up the modem, some options are set by selecting DIP switches and others are configured from the software. We didn't experience any problems with setup, which was quite easy. Setup earns a

good score.

The front-panel indicators tell you the exact state of the modern at all times, closely following the Hayes command set. The dynamic speaker is easily controlled by a slide-type volume control. In addition, the in-modern belp lets you use infrequent commands without hunting

while MNP Level 3 uses a synchronous

full-duplex channel, resulting in 20

percent improved throughput over Lev-

el 2. MNP Level 4 uses a unique format

for sending data blocks, and MNI

Level 5 compresses data to greatly

tocal for error correction rather than a

software-based protocol like Xmodem

or Kermit? The answer is easy. The altorithms used in MNP and Link

Access Protocol-Balanced (LAP-B), the

two leading in-modem protocols, are

far more sophisticated than many

software-based protocols, and MNP, in

particular, offloads the task of detecting and suppressing errors from the system's CPU to improve total perfor-

Another important consideration is

pw a standard recommended by

The CCITT has standardized in-

mendation V.42) using a variation

of LAP-B as the preferred method and

MNP to Level 4 as the alternate

rection (called Rec-

that you're not at the mercy of a

programmer: modem manufacturers

CCITT, the international commit

modem error cor

But why choose an in-modern pro-

improve transmission speed

# Built-In Error Correction: Improving Modem Communication

othing is more frustrating than trying to compose an electronic letter when the modern connecters at you. In the old day, the only my to get around this problem was to redial the connection, with hope that the new call would be less noisy.

If you're generating transfers by band and can see errors as they occur, redialing the modem isn't too much of a headach. However, as more proof sending data, garhled poose lines are an even bigger hasde. Not only can errors slip through undetected, but you're left assuming everything is fine usefil your boss calls, complianing that the quarterly sales report is indecipherare guickly being rejected as unacceptable for modem communication.

On the positive side, there is an rmative to these difficult moderns. With the implementation of in-modern error correction, users can get down to the business of trading data without the nstant worry and hassle associated ith poor phone lines. The primary job of error correction is to guard quality of data. More specifically, error-correcting modems identify and suppress errors, preventing them from attaching themselves to otherwise clean data. Although actual modern throughout may suffer, transmitting data error free the first time is a time-saver in the MNP Level 2 uses an asynchronous

full-duplex channel between modems,

method. As this comparison wat going to press, Hayes announced they were offering ROM upgrades for its V-series to implement V-42 completely.
While there are numbers of moderns on the market without error correction, chances are these will eventually be phased out as in-modern error corrections.

failings in documentation and workmanship offset the low price. On balance, we rate the 2400 HC a satisfactory value.

# Evercom 24E+

Company: Everex Systems Inc., 48431 Milmont Drive, Fremont, CA 94538; (800) 342-5877.

List Price: \$370. Support: Variable warranty depending on date of purchase. Pres: MNP Level 3; lowest-priced modern: slide-type volume control.

Cons: Short warranty; poorly constructed. Summary: Modern for users on strict budgets.

through the manual. The modem does not, however, support synchronous conactions from your PC, making micromainframe communications difficult. Because all of the most important elements are implemented, the Evenx modem earns a good rating for ease of

We found some less-than-professional touches, possibly reflecting last-minute changes. Not only was the solder job marred with fixes, but resistors were skewed and we found chips with amputated legs. We can rate workmanship so

higher than poor.

Everex offers a one-year warranty from the date of manufacture or six mooths from the date of purchase, whichever is longer. Based on our critera,

Everex earns a poor in support policies.
On the positive side, we didn't have any trouble with Everex's technical support staff. We were able to get through without trouble and our questions were answered correctly. Technical support scores a good.

Although the Evercom 24E+ is the lowest priced modern in this comparison at \$370, it is not a product we would rusb out to buy. When balancing the modern's

low price against its so-so performance and poor workmanship, it rates only a satisfactory value.

# Hayes Smartmodem 2400

This is the modem that, when first introduced, phonered several new concepts in personal computer modems. In personal computer modems constantly which the several companion of the personal communications support through an asynchronous port and software, and not-so-parfect command-set compatibility with prior Hayes products. Since that time, the industry has absorbed the minor adjustments Hayes has made to command set and the company continues to set the standard for the rest of the

modem industry.

Because our ratings are based on stendards set by the current marketplace, this old-timer falls short in performance. The Hayes Senartmodem, which doesn't include error correction, was able to squeeze no more than 168 cps through

# our worst-case test in answer mode and 160 cps in originate mode, carning it a



## Smartmodem 2400 Company: Hayes Microcomputer Prod

ucts Inc., P.O. Box 105203, Atlenta, GA 30348; (404) 441-1617. List Price: \$599. Support: Two year warranty.

Prec: No switches; ruggedly built; protected against both power and telephone line spikes; superior micromainframe features. Gees: Comparatively poor performer: n

Cens: Comparatively poor performer; no built in error correction. Summary: Early 2,400-bps modern, which is aging well.

# 9,600-BPS Modem Development

odems offering 2,400-bps are by no means the limit with personal computers. Faster modems that can communicate with the 2,400-bps modems in the product comparison have been around for over a year. Up until recently, though, the y6,00-bps modems available for a resonable price (under \$1,500) have not followed an international standard, which means that different modem brands can only talk to each other at

oranos can consy task to each other at stoner speeds than 9,600-bps modems are split into two groups: They support either V.29 or V.32 standards, as set forth by CCITT, the international committee for communications stan-

V.29 technology is not suitable for PC-to-PC work, although for micromainfirme communications (2780) 3780 remote RJE, 3270 terminal emulation) these 9,600-bps half-duplex modems do just fine. Most PCs expect the modems to be full-duplex, though, and until recently there was no standard. way to emulate full-duplex modems with these half-duplex units. V:32 technology, coupled with something called Trellis encoding, of-fers full-duplex bigh speed suitable for use with personal computers, as well as micromain/rame applications. This technology has historically been expensive — \$2.500 inst a very are, and

sive — \$2,500 just a year ago, and around \$1,200 for units now shipping. For PC users, the most severe drawback has been that V.32/Trelli moderns typically haven't been able to talk to existing 300, 1,200, and 2,400-bps moderns. However, this is changing: Several wendors have announced moderns that communicate at all speeds from 300 to 9,600 bps using international standard techniques. Even better some of these moderns will

eventually be priced under \$1,000. Lite the 2,400-bps modem market, 9,600-bps modems will continue to mature, leading to more affordable pricing, as well as reliable communication between varying types and brands poor rating in each category.

Although there isn't a specific set of written instructions for the expert user, there is very little to do besides hook up the modern and program the options via the terminal or computer. There is no glossary, but the troubleshooting infor-

mation is complete and useful. Nevertheless, documentation earns a good rating. There are no switches to set for this modem; everything is set up using commands. You can tell the modem to show you the current configuration, but the display int is a self-explanatory as for the

display int' as self-explanatory as for the Microcom modem. Setup earns a very good score. Hayes defined the command set with this modem; all other modems in this comparison are judged against this. Ease

companion are progres as a consideration of use earns a very good socre. The Hayes moderns have always set the standard for rugged design. The case is heavy aluminarum, the designers use the heavy aluminarum and designers use from a clever touch that saves space. The superh design has nice features such as protection against power and telephone line spikes, conservative design practices, and I laweless manufacturing. We rate

workmanship excellent.

Hayes warrants its modem for two years. You can also purchase extended warranties. If you need technical help, you can either call (not toll free) or make use of the company's BBS. (Hayes also has an echo mail conference on PC Board.) We rate support policies very

Rather than just telling us what to do, Hayes' technical support staff walked us through each of their suggestions. For this extra effort, technical support is awarded a very good rating. The \$399 Hayes modem has no built-

in error-correction software — a hit behind the times when comparison. However, products in this comparison. However, when it comes to putting and keeping the modern in service. Hayes has few equals; it is a good value.

# Hayes V-Series Smartmodem 2400

This is Hayes Corp.'s second entry into the 2,400-bps market. The V-Series adds error-free file transfer support by combining LAP-B (Link Access Protocol — Balanced), a derivative of the international standard protocol used in X.25 links,

### PRODUCT SUMMARY



# Smartmodem 2400

Company: Heyes Microcomputer Produtts Inc., P.O. Box 105203, Atlanta, GA 30348; (404) 441-1617. List Price: \$899. Sepport: Two-year warranty.

Pres: LAP-B enor-correction plus data compression; no switches; rugged; good spike protection from both power and phone lines; micromaintrame features.

Summary: Good all-around modern for users with lots of different applications. with Hayer' own layer of data comprestion to enhance modem throughput. This modem works better as an answer modem than as a calling one, according to our worst-case test. In answer mode, the modem clocks in at 206 ops, earning a good score. The originate

mode, however, recorded 57 transmission errors at 171 cps, rating a poor store. As with the Hayes Smartmodem 2400, the documentation for this unit is easy to navigate and gets you up and running fairly quickly. Documentation is awarded

a good rating.

The only shortcoming that prevents the V-Series from earning an excellent score for setup is the fact that there is no

sway to sell the modern to print a summary of all settings in an easy-to-read form. Everything else in the modern is set of the most program not included) makes the setup process even easier. Setup earns a very good score.

Regardless of how you use the modem

— asynchronous, micro-mainflame, or

computer LAN bridge— a default can be
easily set. Hayes offers several options on micro-mainflame communication as well
as straight synchronous support. Hayes
also offers a way to send synchronous
data using the asynchronous port. For
these reasons, ease of use is raide very

a The workmanship on this modem is do comparable to that of the Hayes Smart-tmodem. The product is both well-tmodem. The product is both well-tmodem and well-hull, earning it am excellent workmanship rating.

The modern comes with a two-year warranty, including unlimited support wis a BS sand an echo mall conference on

PC Board. Estended warranties are a valiable. Support policies are very good. As with the Hayes Smartmooten, when we called with questions the staff was quite responsive. All of our questions were answered correctly by an enthusiaties staff. We rate technical support very good. Haves has been makins modems for Haves has been makins modems for

The Right Answer: Unplug the Old,

Plug In The New.



MultiModem V32- Full Duplex Modem
Both 9600/4800 and 2400/1200/300 bits per second

Until today, your choices in V.32 9600 bps full duplex modems have been limited. They've been oversized and overpriced, and they couldn't even communicate with 2400 & 1200 bos modems.

Well, that's no longer the case! Multi-Tech's new MultiModemV32 breaks through those barriers and more.

The MultiModemV32 gives you 9600 bps full duplex operation with 4800 bps fallback, over both dial-up and leased lines, just like a CCTT V-32 compatible modern should.

However, the most remarkable thing about

the MultiModemV32 is its ability to perform automatic speed detection and witching between 9600, 4800, 2400, 1200 and 300 bps. This allows the modem to automatically match on-line speeds with other V.32, V.22bis and 212A compatible modems.

 We didn't fireget the central sites! Call on for info on our Model MT9/22R rack-mounted moderns Modem bits per second

But that's not all.

The MultiModerni¥32 incorporates MNP
Class § & Error Correction and Class §
Data Compression with Speed Conversion.
This gives you error-free communications, with throughputs well in excess of 9600
bps. Add to that a full "AT command set, and a full "AT command a full "AT command compatibility, that can satisfy most any application," as a most affordable most any application," as a fund affordable most any application, as a fund affordable most any application, as a fund affordable most any application and a full most any application and a

Why not unplug your older, slower modems? Plug in the new MultiModemV32.

All things considered, the MultiModemV32 is clearly the Right Answer.

Call us toll-free at 1-800-328-9717 for more Right Answers.



Math-Tech Systems Inc. 82 Second Avenue S E. New Brighton, Mannessu 95112 U S A. 10121051-9591 FAX:00121051-95155 Sammatonal Tolox 959052 METH. personal computers longer than any company still in business. The company emphasizes quality over price, which is evidenced by the hefty \$899 price tag. Our enthusiasm for this modem is tempered by its less-than-snappy performance in originate mode and the staggering price. Because of the quality construction and many communications options, we rate the V-Series satisfactory in value

# Microcom AX-2400c

Microcom developed and licenses MNP error correction. The Microcom AX-2400c supports MNP Level 5, which

includes data compression.

This modern excels as a calling modem, less so as an answering one When taking the answering role, the modern pushed 194 cps, earning a good rating. When originating a connection oo

our simulated worst-case connection however, the modern speeded up to 219 cps, earning a very good score. Installation instructions for the novice are clear but not concise enough for the expert to install the modern quickly; we would have liked to see more and better illustrations. The documentation comes with complete troubleshooting, a table of

contents, an index, a glossary, and a quick-reference card. Documentation is This is the only modem of the 10 we ed that had switches on both the front and back of the modern. This sort of tup is too confusing: We never did

# PRODUCT SUMMARY



# AX-2400c

arec Microcom Inc., 500 River Ridge Drive, Norwood, MA 02062; (817) 551-1000 List Price: \$696 Support: One-year warranty.

Pres: MNP Lavel 5 error correction (data compression). Cons: Too many switches for setup. Semmary: Better-than-average performer with worse-than-average setup.

though the manual describes several standard setups and an appendix dis-cusses each switch in turn. We used the recommended switch settings for the AT command set and didn't run into any trouble. Setup is satisfactory.

Once the modem is set, you just instruct the modem where to call. One configuration lets the modern determine whether a reliable connnection can be established and then automatically reacts. The modern supports micro-mainframe boards and has in-modem help and functions to take full advantage of the compression. Ease of use for the AX-



-V-Seri 2224 050 240000 245+ Best Originate 239 239 239 239 239 Best Answer 239 239 239 239 239 eraga Originata 239 239 239 239 239 age Answer 239 239 239 239 239 alt Originate 239 239 239 239 239 Scutt Asswer 239 239 239 239 239 197 Worst Originate 194 187 160 Worst Answer 168

2400c is rated very good. The Microcom engineers paid a great deal of attention to detail when designing this modem. Likewise, the manufactured result was well-executed. This is the only modem in this comparison with a plastic case that incorporates a full RF shield.

RENCHMARK RESULTS

2,400-BPS Modems

We score workmanship very good. Microcom warrants the modem for one year, longer if you pay for the extended warranty. Support policies are rated good.

181 228

When we called technical support, the technicians were willing to walk us through each question. This extra attention is helpful. We rate technical support very good.
The AX-2400 (without data comp sion) is \$599, while the AX-2400c (the model tested, with data compression) is \$699. The \$100 difference is well worth it: you save time as well as toll charges. If you need clean connections, this modern is a good value.

# Multitech Multimodem 224E

The last time we tested 2,400-bps modems, the Multitech Multimodem 224E, which incorporates MNP Level 5. was our product of choice. Again, eighteen months later, it wins bands down, In this comparison we were unable to score the speed of MNP Level 5 because we received a modem with faulty ROM. At a later data, however, we received a fix

# How the competition stands

Introducing the modem with a sleek new stand-up\* design. Telebit's new T1000 Multi-Speed modem. The modem that not only looks different, but is different. With more features. More performance. And a surprisingly low price. More modem for less money.

What makes the T1000 so different? For one, you get a choice of more speeds. The T1000 can send and receive data at 300, 1200. 2400, or 9600 bps using ordinary dial-up phone lines.

So the T1000 can talk to your installed base of low-speed modems, plus the large installed base of Telebit" and other PEP™ highspeed modems.

But it costs about the same as a

2400 bps error-free modem.

Another difference? The T1000 runs at 9600 bps with any type of data-without compression, Error free, With MNP and PEP error detection and correction.

The T1000 fits right in.

The T1000 Multi-Speed modem even talks Haves—right from the box. And if you're using the AT command set or even Smartcom III software, we're compatible. You won't need new software. And you won't need new commands. The T1000 also has internal support for

the most widely-used communications protocols –Kermit, Xmodem, Ymodem and UNIX's UUCP. So you can transfer files up to 3 times faster than any other modem.





# BENCHMARK RESULTS

# 2,400-BPS Modems

	Microcom AX-2400c	Multimodem 224E		U.S. Robotics Courier 2400e	Ves-Tel 2400-33	
Sest Originate	239	239	239	239	239	
Sest Asswer	239	239	239	239	239	
kverage Originate	239	239	239	239	239	1
lverage Answer	239	239	239	239	239	
Difficult Originate	239	239	239	238	239	
Difficult Answer	239	239	239	237	239	

that allowed us to confirm that Level 5 does work.

When testing under Level 4, the 224E still performed quite well. Transmitting at 230 and 218 cps for answer and originate modes, respectively, the Multim 224E earns a very good score in both areas of performance.

194 230

\* All numbers indicate number of characters per so

The documentation provided by Multitech for the 224E is a hit sparse, but what is offered is superb. Information is provided for both povices and experts describing bow to set up the modern. The troubleshooting section is weak, though, and needs beefing up. There is no index or Nevertheless, these problems ere not very troublesome. Documentation earns a satisfactory score.

While setting up the modem, we discovered setup switches that are accessi-

ble through the bottom of the case, with a label that describes them. There are also a few jumper options inside the modern, requiring you to open the modem. The

remaining options are under software control. Multitech stated that opening the case is rarely required. Based on our critoria, however, setup is poor. You can manually select line speed and initiate a connection from the front panel, a trait shared by few modems. The screwdriver adjustment for speaker volume lets you do a coarse adjustment of

the sound level, then you can fine-control the level with software commands. Ease of use is very good. We like the way the 224F is out together. In particular, the component insertion and soldering show a lot of care.



Multimodem 224E

my: Multitech Systems Inc., 2205 data Drive, Mounds View, MN 55112: (800) 328-9717. List Price: \$649. ggert: Two-year warra

Pres: MNP Level 5: top performer; front panel speed selection and call connec-

some jumpers. ment A good modern to use when data must get through clean and quick.

The modern comes with a two-year guarantee, though with no extended warranty or modem swapping. Service policies are rated good. The technical support staff was very helpful in coaching us on how to get the

modem to work the way we wanted it to. We rate technical support very good. If you're looking for a solid huy, this odem will easily meet your needs When balancing its fine performance against the difficult strup, we find the \$649 Multitech Multimodem 224E compares favorably with lesser performers in this comparison. Value is rated good

# Racal-Vadic Maxwell 2400VP

Not only is this modern quite elegant in appearance, which is unusual for a modern, it also supports MNP Level 5. In addition, the modern fits easily under a

standard desk phone The Maxwell 2400VP pushed 192 cps through our worst-case connection when it answered a call, and 196 cps when it originated the call. This earns a score of good for both categories.

The documentation provides sood setup information for novices. However, there are no installation instructions for expert users. The troubleshooting guide is complete. While the documentation has a table of contents, it is missing a glossary, index, and quick-reference card. Docu-

mentation is rated satisfactory. Setting up the modern requires nothing more than issuing the proper com-mands to the modem, including saving the configuration in nonvolatile RAM; there are no switches to set. Setup is rated

Very few personal computer modems let you test the modem from the frost panel; the Maxwell 2400VP is one of the exceptions. You can also switch from voice to data and back using a front-panel button. Like the Multitech 224E, you can set the line speed and initiate a connection from the front panel. The dynamic speaker is controlled by a rear-mounted rotary volume control. Its special features earn it an excellent score for case of use.

This modern offered a few pleasant surprises when we opened it. The speaker is one of the best we've seen. The interior

# up to Telebit's newest modem.

And here's another big difference. Since the T1000 runs the most popular communications software at the highest possible speeds. You can take full advantage of packages like HyperACCESS, Crosstalk-Fast, MicroPhone II. and Acknowledge.

Just plug us in, and the T1000 will fit right in. No matter what your environment. Remote management for ease of use.

Here's the final difference. The T1000 offers a host of remote management features. Including remote access, remote configuration and remote diagnostics.

So get the modem that's head and shoulders above the rest. In features and performance. At just the right price, Telebit's new T1000 Multi-Speed Modem. Call 1-800-TELEBIT or (415) 969-3800, today.

Or write Telebit at 1345 Shorebird Way, Mountain View. CA 94043-1329. Fax: (415) 969-8888.

Because no one gets the message through like Telebit.



\*optional





# 2,400-BPS Modems

	(InfoWorld weighting)	(Your weight	ing)	2224 CEO	Black Box 2400HC	Evercom 24E+	Smartmodem 2400	V-Series 2400
erformance								
Speed								
Answer	(125)	- (	)	Satisfactory	Very Good	Satisfactory	Poor	Good
Originate	(125)		)_	Good	Good	Satisfactory	Poor	Poor
Pocumentation	(100)		)	Excellent	Poor	Good	Good	Good
letup	(100)	_ (	)	Very Good	Setisfactory	Good	Very Good	Very Good
ase of use	(150)		)	Very Good	Satisfactory	Good	Very Good	Very Good
apport								
Workmenship	(125)	_ (	)	Very Good	Poor	Poor	Excellent	Excellent
Support policies	(75)	- (	)	Good	Satisfactory	Poor	Very Good	Very Good
Technical support	(75)	_ (	)	Satisfactory	Vary Good	Good	Very Good	Very Good
falue	(125)		)	Good	Satisfactory	Satisfactory	Good	Satisfactory
inal sceres				6.6	5.0	6.0	6.2	6.5

# to calculate your score

# GUIDE TO REPORT CARD SCORES

Products receive ratings renging from unacceptable to excellent in various catagones. Scores are derived by multiplying the weighting (in

parentheses) of each criterion by its rating, where: Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.75 — Meets all essential criteria and offers significant

na cuges. nd = 0.625 — Meets essential criteria and includes some special

ry - 0.5 - Meets essential criteria.

Inthiforing reviews only finished, production versions of products, never Poor = 0.25 — Falls short in essential areas. Deta test versions. Unacceptable or N/A = 0.0 — Falls to meet minimum star

lacks this feature. Scores are summed, divided by 100, and rounded down to one dec imal place to yield the final score out of a maximum possible score of 10

(plus bonus). Products rated within 0.2 points of one another differ little. Weighlings represent average relative importance to infoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

# REPORT CARD



# 2.400-BPS Modems

	(InfoWorld weighting)	(Your weight	ngo	Microcom AX-2400c	Multiteeh Multimodem 224E	Resel-Vedia Mexwell 2400VP	U.S. Robotica Courier 2400e	Ven-Tal 2400-33
Performance								
Speed								
Answer	(125)	- (	)	Good	Very Good	Good	Poor	Very Good
Originate	(125)	- (	1	Very Good	Very Good	Good	Poor	Good
Decumentation	(100)	(	)	Good	Satisfactory	Satisfactory	Excellent	Very Good
Setup	(100)	- (	)	Satisfactory	Poor	Very Good	Very Good	Poor
Ease of use	(150)	(	)	Very Good	Very Good	Excellent	Good	Satisfactory
Support								
Workmenship	(125)	(	)	Very Good	Very Good	Excellent	Very Good	Very Good
Support policies	(75)	(	)	Good	Good	Good	Very Good	Good
Technical support	(75)	(	)	Very Good	Very Good	Very Good	Good	Good
Yalus	(125)	(	_)_	Good	Good	Very Good	Satisfactory	Satisfactory
Final scores				6.7	6.5	7.5	5.9	5.9

# to calculate your score

# GUIDE TO REPORT CARO SCORES

Products receive retings ranging from unacceptable to excellent in arious categories. Scores are derived by multiplying the weighting (in namentheses) of each criterion by its rating where-Excellent - 1.0 - Outstanding in all areas.

Very Good - 0.75 - Meets all essential critoria and offers suprificant Good - 0.625 — Meets assential criteria and includes some special

factory - 0.5 - Meets essential criteria.

InfoWorld reviews only finished, production versions of products, never Poor = 0.25 - Falls short in ease

Unacceptable or R/A=0.0 — Fails to meet minimum standards or lacks this feature, Scores are summed, divided by 100, end rounded down to one dec

nal place to yield the final score out of a maximum possible score of 10 plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to infoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your

own weightings to calculate the final score.



# Maxwell 2400VP

Company: Recal-Vadio Inc., 1525 McCarthy Blvd., Milpitas, CA 95035; (408) 432-8008 List Price: \$595

Support: Two-year warranty. Pres: Elegant looking: MNP Level 5; can test from front panel; high quality of

Cons. A poor performer in either ent or originate mode. Summary: The Maxwell 2400VP is a fine modem for either answering or originating calls.

is one of the best we've seen. The interior design is beautiful and the workmanship is perfect, earning an excellent rating. The warranty lasts two years and Racal-Vadic will exchange modems duriog the warranty period. There is no extended warranty available, though.

Support policies earn a good score. When we called technical support, we were offered beinful suggestions that went beyond our specific questions. Technical support is very good.

If you need a modem that doesn't take up much desk space, this modern fits the bill perfectly. And for the list price of \$595, you get better-than-average performance with superior ease of use features, making it a very good value.

# U.S. Robotics Courier 2400e U.S. ROBOTICS

IIS Robotics modems are the favorite of the bulletin board operator set, io part because USR offers a bargaio price to BBS operators. This is a mixed blessing

# PRODUCT SUMMARY



# Courier 2400e Company: U.S. Robotics Inc., 8100 Mc-

Cormick Blvd., Skokie, IL 60076; (800) 342-587-5001 List Price: \$699. Sepport: Two-year warranty; unlimited

Pres: MNP Level 5: documentation on modem: slide volume control: discounts

widely available. Coast Worst performer on less than worst-case lines; no micro maintrame support

semant Envotte of BRS operators, the modern is not the best choice for performance-minded users

since, based on our testing, the USR modems are generally not as good at transmitting data error-free as other

transmitting data error-free is other. This is the only modern that couldn't transfer data without errors in our will endounter error with the work of the counter error with the work of the wore of the work of

answer and originate modes. Documentation gives both novices and experts the information needed to set up the modem. The troubleshooting section is complete and well-done; there are no significant omissions from the manual. If you lose the manual all is not lost, because a complete command description is printed on the bottom of the modem itself. Documentation is rated

excellent.

The USR Courier 2400e depends on a number of switches, which are located on the bottom of the modem, to be properly set up. Normally we dislike this type of setup; however, complete documentation is printed on the bottom of the modem to make this an easy process. We didn't have to gick up the manual at all Setup is very

good. Not only is documenation available on the bottom of the modem, in-modem belg is also available, making it easy to belg is also available, making it easy to find the the command you need. Another ince feature is the side volume control for the speaker, which lets you easily adjust to volume. On the downside, the 2400e is the only modem in this comparision that are can't be used with a micro-mainframe board. Balancing this missing feature against an otherwise feature-icld product.

ease of use is rated good.

The modern has a clean, uncluttered layout and great attention has been paid to huild a quality-manufactured modern.

Workmanship is very good.

The modern has a two-year warranty, with an extended warranty available. The support number is toll free. Support policies are rated very good.

We doubt you'll have cause to call technical support, but if you do, don't expect to run into any problems. Our questions were answered quickly and correctly. We rate USR's technical support soud

Despite its problems transmitting error-free in our worst-case test and inability to handle micro-mainframe links, this modem can be expected to handle less demanding traffic without problems. Workmanship is also motable. We rate it a stificatory value at \$699, noting that you should be able to improve on that value because the Courier 2400e is usually available at deep discounts.

# Ven-Tel 2400-33

Most personal computer modests are content to offer MNP or LAPS, the two leading contenders before the CCTT standard was adopted. A third transfer standard, pioneered by Tymnet, called RPC, it was dopted. A third transfer standard, pioneered by Tymnet, called RPC, it was dopted. A third transfer standard, pioneered by Tymnet, called RPC, it was dopted. The transfer mode in the content of the transfer of the transfer mode means a very good score for masser mode by sending 222 cps through

our worst-case connection. It earns a good

score in originate mode with 197 cps transferred

transferred. The Ven-Tel modem's documentation provides novices with everything they need to get the modem up and running. The troubleshooting section of the documentation is complete, covering all of the common, and most of the uncommon that the common, and most of the uncommon to the common, and common the common that the common t

2400.33 is very good.
As shipped by the vendor, this modern
doesn't accept the store-configuration
command (&W) defined by Hayes. You
need to set a DIP switch for this. Another
difficulty is that the switches are inside
the modern, requiring you to open it up to
change settings — a task that Hayes
the command of the command of the command of the
For these reasons, setup cames a poor
rating.



Model 2400-33

Road, San Jose, CA 95131; (408) 436-7400. List Price: \$649. Support: Five-year watterty; swap pro-

gram.

Presc MNP Level 5 error correction (data compression); superb support; good performer at answering cells; solid construction: X PC contocol.

Coss: Buzzer instead of speaker, no software-based setup; switches inside case. Summary: Good modern for time sharing, electronic mail ARS. The Ven-Tel modern uses a speaker state stoucht like a huzzer. It doesn't let you understand any voice that might answer the line (pote hat "The number) or have reached...", so you may have to Daring our sisting, we found that the modern would not accept the commands in the same sequence as other moderns, we had to experiment to find a way to get the moderns to connect properly. Regardens of the drawbacks we've mentioned, the Ven-Tel modern is connect properly and the Ven-Tel modern is connect properly.

use.

The modem case is made of a rugged, heavy aluminum. Unlike every other modem that we tested here, the Ven-Tel 2400-33 adds extra shielding and spike protection around the phone jacks and

telephone interface to improve reliability. Workmanship for the Ven-Tel modem earns a very good rating.

With a five-year warranty (and a swap program during the warranty period), plus an optional extended warranty, the modern earns a good in support policies. We got quick and acturate answers from technical support. In addition, the technicians were willing to walk us through our problems. Technical support through our problems. Technical support

earns a good rating.

This modern lists for \$649. The 240033 is an above-average performer, especially in answer mode. Even though this
modern is difficult to set up, it's a good
product to use for incoming calls such as
an in-house BBS, time-sharing, or electrosic mail. The Ven-Tel 2400-33 is a
satisfactory value.

# **Executive Summary**

be Racal-Valle Maxwell 2400VP is the best-looking modern in this comparison. At 539, it offers solid performance, earning good ratings in both answer and originate modes. Considering its reliability, range of features, and performance, the Maxwell 2400VP is our 2,400-bps modern of choice.

The Microcom AX-2400e is another quality modern. It is priced higher than the Racal-Vadic modern at \$699. The AT&T 2224 CEO is a bit slower than the AX-2400e; however, it provides better setup and is priced about the same at \$695.

The Malitinesh Malitimodeus 224E is the performance leader in this companies. Setup is the only joint at issue; you have to open the modem case to set the DF switches. Ballancing its fine performance against its \$649 price, the Multimodeus is a good buy. Even though the Hayes Smartmodeus 2400 is a sluggish performer, earning poor scores in both answer and originate modes, we expect this modem to last.

ity construction and relatively

low price (\$599) help overshadow its slow performance. The \$375 Black Box 2400HC is not as well designed or manufactured as it could be Likewise, the Evera Evercosa 248.+ (\$370) is poorly manufactured, with less-than-quality solder jobs. However, there modems are the least expensive in this comparison and

may be worth considering.

The Hayer Noeries Senarimodom
2400 operates well in asswer modes
however, in originate mode (word-case
however, in originate mode (word-case
the V-series is well-constructed, this
barely officist the modern's high prior of
\$595°. The U.S. Robotics Courier 2400e
(\$695) was the modern's high prior of
\$595°. The U.S. Robotics Courier 2400e
(\$695) was the modern in this
test, which is less strength then our
worst-case test. In all other scoring
criteria, however, the 2400e earned
studiestory or before retiring.

satisfactory or better ratings.

The Ven-Tel 2400-33 is a good performer, earning a very good score in answer mode. Although it's difficult to set up (switches located inside the box), at \$649, we rate it a satisfactory value.



Wherever your business taken you, take along the Worldford 2000° Partable Wolden Leaving the Worldford 2000° Partable Wolden Leaving the Worldford 2000° Partable Wolden Leaving the world of high yound 2440 by the communications Worldwide, in vistually every situation, including hotel rooms and phone booths, your actions to take the world you would be officiently remains outset. Representing the cutting edge of modern tech-

nology, the Westers that all vertable moderns combine a broad range of features that bring you the best value in moderns today. Features

g that go far beyond costly internal units, such as ing. Bell and COITT standards, direct connect and ad accusate interface (300 and 1200 byo), battery one power, shirt pocket size, and a timy price.

In fact, the Weekli

for both portable and desistop applications. A the WorldPort 2400 comes with Carbon Copy PUIS<sup>700</sup> communications software, for even greater value.

gr of features that bring

If you want a modern that works where you do,

put the WorldPurt Series to work for you. In

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the office. On the road. Or at home For more information about our full line of WorldPort moderns, or the name of your nearest dealer, call us at 800-541-0345. (In New York, 516-261-0423.)







# FIRST LOOK . By Michael J. Miller

# Technology Is Improving but the Song Remains the Same

when we all look day, you can't even buy a hard disk with back at the year less than 20 megabytes. gone by and look In software, Electric Pencil and Visiahead to what the

calc have long since come and gone. next year will bring. This year, I'd like to Hard to believe all that has happened begin by looking back a little further.

As I write this, it's almost exactly 10 in only 10 years. So where will the next 10 lead us? Some changes just keeping years since the first issue of The Intellihappening again and again; in fact, the pace keeps quickening. Memory prices, gent Machines Journal, Jim Warren's biweekly tahloid that was InfoWorld's which had a recent hitch upward, will predecessor. I recently took a look at that begin to fall again, and you can count on first issue, dated December 11, 1978, and getting more memory on a single piece of silicon as we move from 1-messabit chips marveled at how far we've come. Infoto 4-megabit and even 16-megabit chips.

Desnite complaints about "dumpina" World has gone through lots of changes,

and so has the computer industry. Despite complaints about The machines that were importa and counterproductive trade regulations. then were the Tandy TRS-80 line, the as long as we keep getting these improve-Apple II, the Commodore Pet, and various machines based on the S-100 hus ments, prices will fall in the long run.
Similarly, central processors keep getting more powerful. The first machines and/or the CP/M operating system. Typically, these machines were based on ised on the 68030 have just appeared the lotel 8080, the Z-80, or the 6502

and we'll see the first 80486-based central processor. Since then we've moved past the 8088 used to the PC and machines probably by the end of 1989 And there's no end io sight In other areas, we're beginning to see

the culmination of trends that have been brewing for several years. Machines are getting better connected. While local area networks have been around for some time, they've only become really popular in the past year or so. This should accelerate, as we see new applications that take advantage of the network rather than just using it for

rudimentary file sharing and communica-Multitasking will be the standard way of working in the future, whether under OS/2, Unix, or future versions of the Mac system. Graphics-based user interfaces will be the rule, not the exception, no

that Microsoft Windows and the OS/2 Presentation Manager are taking off. Applications will be much lar more sophisticated, and more difficult to create. Expect to see more programs ship late because of the complexity of these

# Intelligent Alachines Tournal



An emphasis young advance your problem in committing in other party of money that most of the methods; so come to be been as the committee of the committee of



PAGE 65

Personal computer technology has changed quite a bit since the first issue of The Intelligent Machines Journal, which dealt with CP/M and Apple II software.

In one respect, I expect software may actually become closer io concept to the way it was 10 years ago. Back then, many users wrote their own programs. Tomorrow, with more sophisticated but easierto-use macro languages, lots of options, and new operating environments, I expect many people will start with the off-theshelf packages and combine and customize them to create their own unique

applications and environments. If the technology is improving, though, it's useful to note that other ngs haven't changed all that much. That first issue of The Intelligent Machines Journal dealt with many familiar issues. The lead article was coocerned with converting CP/M disks among machines made by firms such as Cromemco and Northstar. National Semi conductor was proposing a new trade policy with Japan to combat the "dump-

ing" of memory chips, which were supposed to have caused an imbalance of trade. Apple had just appointed its first specialist to target the educational market. Qume had introduced a double-sided disk drive. Jef Raskin, then Apple's applications software director and later the original designer of the Macintosh, was pushing for a new standard for Basic for personal computers. Several lawsuits were concerned about "emulating" the

functions of one chip on another. In the years that would follow, we would hear much more about porting operating systems, chip dumping, setting standards, and various lawsuits It seems that technology keeps improving, but in other respects the song

First Look examines new personal computer products before they have been through a formal review.

# The IIx: Not Much Faster but More Competitively Priced Than Mac II

On first impression, the Apple Macintosh Hx is a bit of a disappointment. We expect machines based on new processors to be significantly faster than those that preceded them, but the new high end of the Macintosh line simply isn't much faster than the Mac II. In other ways. however, the IIx offers some additional features and a surprisingly competitive price that may make it worth a look The Mac IIx is identical to the Mac II except for its processors and floopy disk drive. The IIx comes with a 15.667 MHz (they say 16-MHz) Motorola 68030

the 6- or 8-MHz 80286 used in the PC

AT, to a point where most machines are

oow based on the Motorola 68000 family,

16K of memory, with 48K and 64K

machines looked upon as luxuries. One

article lists a new 16K add-in board for

\$965. Today that same money (less, given

the inflation since then) will get you 2

megabytes of memory - 128 times as

much. (The Mac II on which I'm writing

TRS-80 Model I into the local Radio

Shack to have it upgraded from 4K to

16K of memory. The salesman looked at

me questioningly, assuring me that 16K was "more memory than you will ever

Back then, you were lucky if you had a

pppy disk drive that stored 70K to 100K

of information - many of us were still

need." Little did be know

As an aside, I still remember taking a

this column has 5 megabytes of memory

lo 1978, most machines had 4K to

the Intel 80386, or at least a fast 80286

CPI Land a 68882 math connocessor chin. instead of the 68020 and 68881 used in the Mac II. Although the processors are from the next generation, they run at the same speed, so applications simply don't run much faster. Motorola offers faster versions of the 68030, but Apple hasn't announced a machine based on faster chins. For now, you'll have to settle for a 10 to 15 percent performance improvement in most applications Using the 68030 does offer a major

advantage for people running Unix, bowever, It contains its own paged or array contage and features, which the 68020 does not. Mac II users who want to run Unix have to purchase an optional

68851 pased memory m (PMMU) at a list price of \$499. The other important enhancement in

the IIx is the new floppy disk drive, called the Floppy Drive, High Density (FDHD). The FDHD can initialize, read, and write 1.4-mesabyte high-density 3%-inch floomy disks as well as the standard 800K and 400K Macintosh disks. More impres ly, the disk drive can also read MS-DOS-OS/2-formatted 1.44-merabyte and 720K 3V-inch disks

Unfortunately, this isn't as simple as it sounds. If you insert an MS-DOS-format diskette while running the Finder, you still get the message "This is not a ntosh disk. Do you want to in it?" The IIx will only recognize MS-DOS disks through the Apple File Exchange utility. This utility, which is included with certain kinds of files from MS-DOS to Macintosh and vice versa. You can translate text files directly and files in DCA-RFT format (a standard word processing interchange format) to Mac Write format. You use the same process for moving other files, selecting the "default translation," and executing the translate command. It would be nice to

see an option for just plain copying files.

Despite the complexity, being able to read and write MS-DOS-format disks from the IIx's internal disk drive is coovenient, and you don't have the format disk drive.

The applications I tried on the IIx all seemed to run fine, with one exception Microsoft Excel 1.5 will not recomize the 68882 math coprocessor, so it actually runs slower than on a Mac II where it can use the 68881. Microsoft has said it will fix the problem shortly

On the positive side, the IIx is wellpriced compared to the admittedly expensive Mac II. The IIx comes with 4 meanbytes of memory (expandable to 8 megabytes) and has a list price of \$9,369 with an 80-mesabyte internal hard disk. That's not counting other add-ons, such as an extended keyboard (\$229), Apple color monitor (\$999), and video adapter (\$648). Still, a Mac II with 4 merabytes of RAM but with a 40-megabyte internal hard disk carries a list price of \$8,069 price between the two machines is only about \$800 - not much more than you'd gay for a larger hard dick alone. For the difference, you get a more powerful CPU and a disk drive that can store more and



disk drive that can read DOS disks. also can read MS-DOS disks

consider the IIx.

Existing Mac II owners can upgrade to a IIx logic board for \$2,199; the FDHD undate kit has a list price of \$599. Both seem like steen prices for most users. But if you're looking at new machines for high-end worn and you used a Mar II with 4 megabytes of memory, you have to

INFOWORI O

# Style Sheet Add-On Packages Increase Desktop Publishing Power

y now, most of us agree that desktop publishing programs live up to their promises of providing quick, ioexpensive, professionallooking pages. To be sure, these packages deserve their many plaudits, but to be fair, we must also admit to their shortcomings - including their limited selectioo of style sheets and lack of file management capabilities - which can frustrate even the most seasoned user. Fortunately, a bumper crop of desktop publishing add-on programs has ap-peared and is making desktop publishing a whole lot easier.

Take, for example, Xerox Ventura Publisher. This program comes equipped with a nice set of style sheets: standard designs adequate for basic publication needs. But after you've used Ventura for a while, you yen for a bigger style sheet selection. Granted, you can make dn by customizing your own style sheets. But what relief is there for those of us who

don't want to become part-time graphic designers? Style sheet add-ons are the answer, and they're bound to make your desktop publishing life a good deal easier. packages present the option of using a wbole new set of style sheets as they are or as starting points for your own design. Studying a select few of these style sheets is also a good way to share the vision of savvy graphic designers, since all the packages claim to have experienced

signers behind them New Riders Publishing offers three volumes of Ventura style sheets - one with 30 style sheets for business documents, one with 25 style sheets for cal documents, and another with 25 style sheets for one-, two-, three-, and four-column newsletters. Included with each set is a book containing full samples of each style sheet, as well as design tips explanations on bow special effects in the designs were created. Each book also contains easy-to-follow installation instructions. Some of the style sheets, such as the Proposal template in the Business Document set, are particularly smartlooking and will add spice to your pagedesign collection. At \$39.95 per set, I found the New Riders style sheets to be a very nice value.

Style Sheets for Business Documen Style Sheets for Technical Docu and Style Sheets for Newsletters: \$39.96 for each book and disk set; New Riders Publishing, P.O. Box 4846, aks. CA 91360: (818) 991-53922.

If you have a Postscript printer, you'll like the professional look of Ventura Designer Stylesheets from BCA/Deskton Designs. The designs for these style sheets have won several professional deards. One drawback is that some of the ign elements are based on encapsulatostscript files, which can't print on a oon-Postscript printer. I also wish the accompanying documentation would inde a sample of the style sheet. BCA/ sktop Designs bas over 30 style sheets allable at a relatively steep cost of \$29.95 per style sheet. If you can't find a style sheet that suits your needs, the company will create a custom one at your

Ventura Designer Style Sheets: \$29.95 per style sheet: BCA/Desktop Der O. Box 2191. Walnut Creek, CA 24595: (415) 946-17163 I was particularly impressed with the simple presentation of Document Gallery

18122148 CHECKING RECORD & IN ZIP CODE 94546-Ellse Uttee Hr. 123-1234 Mr. 123-1234 Digitronics 1222 Clifton i Olgitronics 1222 CLIFts Rd Castro Villa, D Centro Vitte, Co 1/1/8-03 15.00 COut a Duplicate

An interesting twist to the Power Desk collection of applications is the duplicate finder, which looks for contacts with similar addresses in the same ZIP code.

Style Sheets, a collection of 58 style sheets for Ventura on a single disk, including 17 newsletters, 18 directories and catalogs, 17 technical documentation styles, and six business forms. A short, clear, sample-rich pamphlet is included. The same folks who developed many of the original Ventura style sheets designed this package, the quality of which is outstanding. At \$39.95 for 58 style sheets, this package is a bargain.

Document Gallery Style Sheets; \$39.95 for pamphlet and disk; Micro Publishing, 21150 Hawthome Blvd., No. 104, Torrance, CA 90503; (213) 371-

I also tried a utility containing Pagemaker templates. Instant Pagemaker consists of 20 downright beautiful templates. including some necessary ones such as calendars and resumes that for some reason are rarely included in style sheet collections. As an added bonus, the disk is packaged inside one of the best graph design primers we've seen uld easily become a standard feature in a Pagemaker user's libra

stant Pagemaker (IBM, Version 3.0): \$39.95; Simon & Schuster Inc., Bra Books, One Gulf+Western Pla York, NY 10023; (212) 373-8142, Back to Ventura Publisher: As great as entura Publisher is, it does have a drawback. It doesn't contain a workable method for documenting or managing

style sheets. If you create complex uments, you can end up with a bunch text and picture files incated nn erent drives and under various subdirectories on your PC. VP Toolbox (Version 3.0) automates Ventura Publi file management by furnishing both screen and prioted output that indi where various files are located and what they contain. The package maintains a master catalog of each style sheet, chap-

ter, and publication and allows you to annotate the catalog with your own

If you've used Ventura for any length of time, you know it doesn't take long before you end up with many more style sheets than you started with and with several new tass in each style sheet. VP Toolbox's file management structure makes it easy to locate a particular style sheet and to copy than from one style sheet to another. A nifty feature for those of us who forget what a certain tag looks like is the way the package automatically

creates a complete sample chapter that shows you the appearance of each tae. The user interface couldn't be simple: with most functions activated by a single mouse click. Serious Ventura users will wonder how they managed without VP

VP Toolbox, Version 3.0; \$99; SNA :., P.O. Box 3662, Princeton, NJ

08543; (609) 683-1237. — Barbara Assadi

## Power Desk SOFTWARE STUD

Power Desk is not, as I assumed at first ce, a desktop organizer along the lines of Sidekick. For one thing, although it includes a calculator, word processor spelling checker), calendar, and DOS file manager, it is not memory-

Instead, with a 4 million-name co database. Power Desk is an "office system" for those whose work revolves around keeping track of people. The database - predefined with name and ress, salutation, three-digit flag field and date field labeled "expiration date ties into the word processor for generating mass mailings, into an autodialer, and ioto a print utility that generates envelopes, a phone directory, or custom reports. The calendar includes a to-do list that brings forward undor items and maintains an audit trail for done items, as well as a "reminder" list tied to specific dates. A timekeeper makes it easy to log phone calls and time spent doing client work, and an alarm alerts you

It works well enough, and I get lette from people who swear by the product, implementation (the calendar can't han dle being under Desqview, and hitting the Escape key frequently drops you right back to one of the pull-down menus at random), but what makes Power Desk interestingly different is a dupe (short for duplicate) finder, a utility that helps you clean up your name and address list, Working from ZIP code and address fields, rather than names, it shows multiple people at the same address, Staylering those side by side. This will save you postage if you don't want to mail to two people in the same family. You

could do this yourself by printing your file

dupe finder also matches similarly spelled addresses in the same ZIP code, catching A dupe finder is a good idea. Dupe purging is such a pain in the neck that

most people who maintain their mailing lists on PCs don't bother. If you work from name lists regularly updated from outside sources or you merge lists from multiple sources, this simple and inexpensive dupe finder could save a lot in postage or time-consuming dupe purging. Power Desk, Version 1.23 costs \$99 and requires an IBM PC or compatible

with at least 360K, MS-DOS 2.0 or later, a hard disk drive, and a modern if you want to use the auto-dialer. A 31/s-inch disk version is also available. Software Studios, 8516 Sugarbush, uite 104, Annandale, VA 22003; (800)

272-3375, (703) 978-2339 in VA. - Michael McCanhy

## Timeslips III MODIU EDGE SOFTWARE

Timeslips has done it again. North Edge Software has taken its excellent MS-DOS time and billing package and made it even

While the original Timeslips was designed to track time, bill clients, and print custom reports for 10 users and 200 clients, Timeslips III can handle 250 users and 3,400 clients, quite an improvement. Also new is a networking versinn that centralizes an entire office.

The screen has been redesigned, and both timer and report modules run more quickly and efficiently. Several cumb some commands have been shortened to a single keystroke. The formerly no-frills ocumentation is now detailed, easy to follow, and well-illustrated

I created several Timeslips as tracking my incoming calls, I found I never forgot to turn off the automatic timer after completing a call - the bright red "active" sign and the red clock ticking away on-screen were constant reminders. I used the report program to generate

ports and bill "clients." I was able to define the text of my bill and customize its appearance, as well as create a customized message. With Timeslips, I can create productivity and accounts receivable reports that present Timeslips data in several ways. I was impressed with the case with which I created a simple activity report and client billing worksheet.

add-on product links Timeslips to products from eight vendors, including Great Plains, Peachtree, and Dac-Easy. The network version of Timeslips sells

for \$699 for 12 stations. If you travel a lot, you should check out the \$79.95 TS Remote, which exports time and expe data to the main package. A \$99,95 spelling checker makes sure your client bills are spelled right.

Timeslips III for the single user costs \$199.95 (Timeslips I is still available at \$129.95) and requires MS-DOS 2.0 or later, 512K of RAM for the main program, and 80K for the timer (or 10K conventional memory if you have

North Edge Software Corp. Western Ave., Essex, MA 01929; (508) 768-6100

- Jo Rainie Rodgers

# The InfoWorld

Our 100 Top-Rated Products of 1988

hat were the best products of 1988?
We put InfoWorld's rating system to work and
came up with this list of the top 100 hardware and
software products of the year. These top 100
highest marks awarded in InfoWorld reviews, product
comparisons, and Test Center reports over the last 12 months.

comparisons, and less Center reports over the last 12 months. The InfoWord Test Center and Review Board performed nearly 700 product evaluations in 1988, and no product scored a perfect 10. Instead, the number one position — with a score of 9.3 — is shared by Microsoft Excel for the PC and Version 3.0 of Symantics Q&A database. In second place at 9.1 is Macintax Taxview. These are the only products in our list that achieved scores in the nines.

The highest-scoring hardware product was a desktop computer, the Wells American Computar, which earned an 8.7. Close on its heels were a trio of 25-MHz 386s from Everex and Proteus (they each scored 8.6) and from Micro Express (8.5).

Some products received two scores this year — for example, in a stand-alone review and also in a product comparison, or reviews for two subsequent versions. In each case, products are ranked here according to their most recent scores.

ranken nere according to their most recent scores.

Products that made the cut are listed under the hardware or software heading that best describes them. Product categories without any high-scoring products are not represented here.

We actually ended up with 92 products scoring 7.6 or above, and 21 products with identical scores of 7.5; these tied for places 93 through 100, and are listed separately.

In hardware, we updated the prices, which are for the configuration tested. In software, we list the version we tested; later versions may now be available. All comments, criticisms, and comparative remarks are summarized from the review and are current as of the review date.



# SOFTWARE

# Accounting

7.9 Accpus Plus, April 25.
Version 5.0 of Accpus Plus (formerly Easy Business Systems), with a completely redesigned user interface, for the second year running wins the lead spot among MS-DOS accounting

The new interface in Accpac Plus leans toward graphics, with windowing menus that layer themselves on top of each other as you progress into the meau structure, as you progress into the mean structure, letting you see exactly where you are. A wide range of accounting modules, the availability of many third-party add-ons, and good reporting capabilities (particularly for general ledger work) in this high-end package, together with a solid upgrade path, overshadow a some-

what complicated report-writing function and make Acopac Plus a sound chaice. List price, \$695 each for GL, AR, and AP; \$195 each for Easy Filer and Report Writer. Version tested (5.0) available for the IBM PC, XT, AT, PS/2, and compati-bles running MS-DOS 3.1 or later. Requires 512K of RAM, o hard disk, and a 132-column printer. Computer Asso-ciates International Inc., 1240 McKay Drive, San Jose, CA 95131; (408) 432-



capabilities don't adversely affect the performance of this entry-level accoun ing package for the Macintosh. The graphics-oriented ser interface, with screens that duplicate the familiar

paper forms you'd produce by band, makes Simply counting extremely simple to use The GL. AR. AP. inventory.

costing, and payroll modules are well-documented, and switches from one module to another are fast. The package has a useful feature that lets you suspend work in one area and inquire into er, returning to the place where you left off. Simply Accounting is unusua inexpensive for such an accounting package, S imply Accounting is simply a very good value

List price, \$349. Version tested (1.0) available for the Macintosh 512E or late running System 3.2 and Finder 5.3 of later. Requires I megabyte of RAM, 128K of ROM, and an 800K ext dford Software Corp., 15311 N.E. 90th. mand, WA 98052; (206) 883-0074.

# Bulletin Board Systems

7.7 PC Board, August 15. In place of couriers or wide area computer networks, many multioffice companies are relying on computer bulle-tin board systems (BBSes) for high-speed.

With one of the largest installed user bases in the United States, PC Board offers support for high-speed (9,600-bps) modems, a variety of file-transfer protocols, and several multitasking shell programs (Desqview et al.). Security is flexible, with both password and lockand-key protection for files and messages. here are 100 access levels for users and 10 for the system operators, who can define menu functions, time allotments. and size timing for the transfers. Excellent performance together with



Access Plus offers windowing menus that layer themselves on top of each other.

se of use and very good support make PC Board a very good value.

List price, 380 (single-line version) \$120 (single-line with doors), \$180 (three-

line with doors), \$380 (nine lines), \$980 (99 lines), Version tessed (12.1) available for the IBM PC, AT, PS/2, and compati-bles running MS-DOS 3.0 or later. Requires 320K of RAM, a modem, and o hard disk. Clark Development Co. Inc., P.O. Box 71365, Murray, UT 84107; (800) 356-1686, (801) 261-1686, BBS (801) 261-8976.

7.7 RBBS-PC, August 15. One of the oldest and most

ular shareware BBS programs, RBBS-PC is easy to port to many different dware systems. Like PC Board, RBBS-PC supports a variety of modems and protocols, and offers the same security

The program supports up to 36 nod but addresses only two serial ports. To run RBBS-PC with more than two phone lines, you need special hardware or a local area network. Operation on multiple nodes requires Desaview or a similar

ultitasking program.

One feature of RBBS-PC, an auto sloading option, is unique amo the BBS packages we tested. This capability, together with the comprehensive menu interface and other substantial features of the program (including "doors" to other applications), earns RBBS-PC a score of excellent for ease of

use. Its shareware pricing scheme makes List price: No charge through Aircom BBS; otherwise, there is a \$16 library fee from the Capital PC Users' Group. Version tested (CPC 16-1a) available for the IBM PC, AT, PS/2, and compatibles tine MS-DOS 2.0 or later, Ro

320K of RAM and a modern. Hard disk recommended. Capital PC Users' Group, P.O. Box 6128, Silver Spring, MD 20906; voice (203) 268-9656; BBS "Aircom" (415) 689-2090

# Communications

7.6 Relay Gold, November 28.
This smooth-running, easy-to-use communications program offers top-notch micro-mainframe capabilities in a package that includes the asynchron data-transfer and terminal-emulation feaes of its stable-mate Relay Silver. Relay Gold supports the most popular ortugity protocols and can issuelle up

Its com rehensive user directory is augmented by a log file of calls made, a voi to-data switch, and an unattendedoperation mode like that of a BBS We doubt whether anything short of fully customized software could do a

better job of handling across-the-board communications needs, especially if those needs include talking to mainframes. List price, \$295. Version tested (3. available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 192K of RAM and a modern, direct connection, or emulation board. Relay Communications Inc., 41

Kenosia Ave., Danbury, CT 06810; (203) 798, 3500 Computer-Aided

# Design (CAD) 8.3 Autoced Version 9,

Competitors this year added three-dimensional modeling in an effort to topple venerable Autocad from its spot as king of the CAD hill - but the king hasn't falle d. Autocad introduced Autoshade. an add-on that lets users produce trueperspective, 3-D finished renderings in

256 colors. Version 9 has other major improve ments, including "associative dimension-ing," which automatically recalculates

reshape a drawing. It has added 20 new text fonts, some of which include mathematical, scientific, and engineering alpha bets and symbols. Files are now directly compatible among any of the systems on which Autocad runs (DEC VAX, Sun, and Apollo workstations). An advanced user interface duplicates the menu scheme in the Autosketch drafting package, making command execution faster and as intuitive as in Microsoft Windows. Minor drawbacks (the still-primitive 3-D capability and the inability to dn "subtractive joining" of objects) don't keep the new Autocad, especially with Autoshade, from being a very good value. List price, \$2,850 (Autothade, \$500) Version tested (9) available for the IBM PC, AT, and compatibles running MS-DOS 3.0 or later. Requires 640K of RAM.

Video board capable of disploying 256 colors recommended for Autoshade. Autodesk, Inc., 2320 Morinship Woy. Sausalito, CA 94965: (415) 332-2344. 7.8 Varanced Design, March 7.
This 20th major revision of Versacad Design moves the program into the 3-D realm, in which it turns out to be much stronger at creating geometrical shapes

a math coprocessor, and a graphics display. A hard disk is recommended.

than its archrival Autocad. The 3-D mode includes a new "camera" enhancement that lets you designate your eye-point and center of interest in three different ways, and also lets you change the angle of vision from 5 to 85 degrees. Mass calculations to report volume, surface area, mass, center of gravity, and movement about an axis are also part of the 3-D mode.

Otherwise, the appearance, operatio and capabilities of the program's 2-D module have changed very little since Version 5.0 of 1986. Drafting details have been improved, but limitations persist, in the lack of a true freehand sketching capability and the capability in 2-D to see more than one view of a drawing at a

Nevertheless, the incorporation of 3-D modeling and the Bill of Materials feature (together worth about \$1,500) in a program that's priced about the same as Autocad, makes Versacad Design an excellent value.

List price, \$2,995. Version tested (5.3) available for the IBM PC and compatibles running MS-DOS 2.0 or later. Requires 640K of RAM, a hard disk, a graphics board, and a pointing device (mouse or digitizer). Recommended: math coproces-



to 15 communications sessions at once. Autocard, Version 9 retains its aget as kind of the CAD hill.

low-cost commu

sor, 286- or 386-based system, highresolution graphics display. Versacad Corp., 2124 Main St., Huntington Beach. CA 92648: (714) 960-7720.

## Database and File Management

9.3 QAA, May 9. With this release, Q&A, the file manager/word processor that won InfoWorld's 1987 Product of the Year in its previous version, graduates from the flat-file category by adding the capability to draw information from more than one file at a time. Network support, unusual for products in this class, is another new feature, bolstered by password protection

Combining exceptional ease of use with multifile access, flexible database operations, and medium-power word processing. Q&A is a superbly integrated product and an outstanding value.

List price, \$349. Version tested (3.0) available for the IBM PC, XT, AT, PS/2. and compatibles running MS-DOS 2.0 or later. Requires 512K of RAM, two floppy disk drives (31/2-inch disks available at no charge). Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; (408) 253-

8.5 Rhose for DOS, October 17 (single-user version reviewed April 18). Micronim Inc. seems to bave designed Rhase for DOS with networks in mind. It runs with a gateway option that provides access to data stored on minis. mainframes, and other non-DOS sys tems, including those running under

OS/2 The current version's combination of spressive performance and multiuser tools has earned it the well-deserved respect of software developers. In InfoWorld's mixed-use multiuser test. Rhase beat its rivals by a wide margin. Its transaction processing is also respectable.

neck and neck with that of Borland's Easy to learn, comfortable to use modestly priced, and offering top-notch multiuser capabilities, Rbase earns an excellent score in value.

List price, \$725 (one to three users) \$995 (six users). \$2.695 (unlimited users) run-time modules (five copies), \$256 Version tested (2.0) available for the IBM and compatibles run PC, XT, AT, and compatibles running MS-DOS 3.10 or later. Requires 640K or RAM and a hard disk. Dedicated network server recommended. Microrim Inc., 3925 159th Ave. N.E., P.O. Box 97022. Redmond, WA 98073; (206) 885-2000.

# 8.2 Clerice Professional Developer, July 4.

If serious database program development is a disease, then Clarion is the cure. Version 2.0 eliminates earlier flaws and lets Clarion Professional Developer come into its own as a database development system and toolbox for the professional

New modules, the Translator and Designer, produce true executable files and let you speed up the generation of applications without limiting the degree of customization.

Minor drawbacks (the lack of multi level security and a limited support period) have little impact on the usefulness of this program, which can cut development time creatly. A must-have for professional applications program-

List price, \$695 (included run-time is in public domain). tested (2.0) available for the IBM PC, XT. AT, and compatibles running MS-DOS 2.0 or later. Requires 512K of RAM (640) recommended) and a hard disk drive

Clarion Software, 150 E. Samole Road Suite 200. Pomogno Beach, FL 33064: (800) 354-5444, (305) 785-4555.

8.1 Peradex 2.0, October 17 (single-user version reviewed April 18). Our 1987 Product of the Year among database systems, Paradox richly deserves its reputation as a favorite of multiuser database developers. Its singleuser code, running unchanged on a network, is highly capable, attentive to users' needs, very automated, and everconscious of data security.

Other capabilities that make it a standout in network operation are its encryption option, identification of lock owners and network users, and superior network installation manual. Its only trade-offs are some speed penalties for the benefits of automation and convenience. Although not the fastest multiuser.

multifile database we tested, Paradox is powerful and likable, and an excellent value. List price: Version 2.0, \$725 (single node), \$1,695 (six users): 386 version, \$1,890 (seven users): OS/2 version, \$1,790 (seven users); Version 2.0 run-time module, \$9.95 each: 386 version run-time module \$29.95 each Version tested (2.6)

available for the IBM PC, XT, AT, and compatibles running MS-DOS 3.10 or later, Requires 640K of RAM, A hard disk is recommended. Borland International 1800 Green Hills Road, Scotts Valley, CA 95066: (408) 438-8400

8.0 Repidfile 1.2, May 16.
Rapidfile works remarkably well.

integrating easy-to-use file management with strong form-letter canabilities, a spelling checker, and an excellent add-on thesaurus. It can also be quite speedy The manual, on-line tutorial, and online help are excellent, and support is very good. For list management, form letters, mailing labels, and other simple data

# Mother Nature Can Teach Us A About Hard Disks.

It can happen with no warr The sky goes dark and then it's there A whirling funnel that destroys everything in its path, leaving little or nothing that can be retrieved. Just the way that disaster can strike your hard disk, scattering your ata to the wind.

Virtually nothing is safe from a tornado, but fortunately there is a way to protect your hard disk data from a crash It's called EASTBACK PLUS. And

though you can find cheaper programs, you won't find a better one, at any price.

With EASTBACK PLUS, daily incremental backups can take as little as a minute a day. In fact, backing up a full 10 megabytes on your hard disk takes only about 4 minutes." And that makes EASTRACK PLUS the world's fastest backup

And now with version 2.0, there are more features than ever. While supporting DOS 31/2 or 51/4 inch floppies, it simultaneously reads your hard disk as a writes data to floppies, tape, cartridges or any other logical DOS device. With data compression, it cuts the number of backup disks in half. Plus, there's a unique "restore estimate" feature that tells you what disks to use, and warns you if there isn't enough room left on your hard disk. And version 2.0 is easier than ever to use. So easy, and so fast, you actually

will use it. Every day And that's the whole point. But you

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Fifth Generation Systems, Inc. Baton Rouge, LA 70809 (800) 873-4384, (504) 291-7221

snagement needs, Rapidfile is well worth a look List price, \$295 (upgrade from Version 1.0, \$35). Version tested (1.2) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 256K of RAM (384K with DOS 3.1 or later, network use, or with thesaurus), and two floppy disk drives

Ashton-Tate, 20101 Hamilton Ave., Tor-rance, CA 90502; (213) 329-8000 8.0 Smart, April 11.
We evaluated the database components of five leading PC integrated

packages, and Smart's database came out on top Smart contains word processing, spreadsheet, graphics, and communications modules, but its database module is the standout of the bunch. With more than 120 built-in functions and very fast sorting routines, each of its files can hold one less than 1 million fixed or variable records. It can read or translate ASCII and Dbase files, and can write files in those formats and also in DIF, Svlk, and

undelimited form. Although pricey compared to Open Access II, and lacking that package's SQL support, Smart is fast, powerful, well-integrated, and easy to install and configure (it comes network-ready), with very smooth cross-module operation. For database purposes, Smart is a winner.

List price, \$895. Version tested (3.10) available for the IBM PC, XT, AT, PS/2

and 100 percent compatibles running MS-DOS 2.0 or later (DOS 3.1 for networks). DOS 2.0 or auer (DOS 3.1 for memons). Requires 384K of RAM. Informix Soft-ware Inc., 16011 College Bird., Lenexa, KS 66219: (800) 438-7627, (913) 492-3800 in Kansas

7.9 Fliemeker II, November 21 (Macintosh Target Edition). Acquired recently from Nashoba Systems by Claris, Apple's software spin-off company, Filemaker II is a first-rate update to

the best flat-file database manag system available for the Macintosh line of Filemaker II improves on its predecessor with maior enhancements like the incorporation of automated command scripts, networking capabilities, and

new characteristics for fields. Other new features include better layout tools for designing forms, reports, and browse screens, a file-compression option; and hierarchical menus. With a strong graphical user interface,

good sample templates and tutorial, a anual that's a model of clarity, and supporting a wide range of features, maker II is an excellent value. List price, \$299 (single-user license), upgrade from Filemaker Plus, \$50. Version tested (1.0) available for the Macintosh Plus, Mac SE, and Mac II running System 4.2 and Finder 6.0. Requires 1 mesabyte of RAM and two 800K flopps disk drives. Claris Corp., 440 Clyde Ave., Mountain View, CA 95043; (415) 960-1500

7.8 Database, April 18. how easily you can develop complex relational database applications in Datacase without doing any program ming at all. This menu-driven system takes pains to shield users and even greenmanch New the dreaded command line, and is easy enough to learn and use that the manual is almost superfluous. The only major handicap is ers' pack with a run-time system mod A LAN version is also available, with intelligent data-locking features. We rate it an excellent value.

List price. \$600 (single user), \$700 (first of multiple users), \$900 (each additional three network users). Version tested (2.5r3) available for the IBM PC , and compatibles running MS-DOS 2.0 or later. Requires 512K of RAM. (Network version requires 640K and PC-/MS-DOS 3.0.) Hard disk recommended. Dataease International, rive, Trumbull, CT 06611; (800) 243-5123, (203) 374-8000 in CT

7.6 Open Accass II, April 11.
A close second to Smart in our study of databases in integrated packages was Open Access II. The database holds

up to 2.2 billion records - more than should ever be put on a microcomputer. In this and other areas, Open Access II exceeds the limits of many stand-alone database packages. Data entry is quick and easy, even for

relational forms. Reporting, program-ming, and database design are also simple, on a par with those of Smart. Documentation isn't, alas, making the program less easy to learn and use than it it be. With its SQL support, Open Access II offers a strong challenge to stand-alone

database programs. It beats Dhase and Rhase on price and still offers four other integrated functions, making it an excellent value. List price, \$695. Version tested (2.05) available for the IBM PC, XT, AT, PS/2.

and compatibles running MS-DOS 2.0 or later. Requires 384K of RAM and two floppy disk drives. Software Products International Inc., 10240 Sorrento Valley Road, San Diego, CA 92121; (619) 450-1526; (800) 937-4774.

# Desktop Publishing

7.6 Xerox Venture Publisher for the IBM PC, December 19 (also reviewed June 20). Designed to run under DRI's GEM and introduced short ly before Aldus Pagemaker for the P Xerox Ventura Publisher has quietly become the yardstick desktop publishing gram in the MS-DOS world. Indeed InfoWorld's readers voted it the 1987 Product of the Year in this category (an honor it shared with Aldus Pagemaker 2.0 for the Macintosh)

Ventura Publisher underwent major

revisions in an effort to appeal to even higher-level users. Its powerful, high-end layout and typographical features handle a broad range of documents quickly and efficiently utilize functional style sheets. In Version 2.0, Ventura acknowledged Pagemaker's popularity by adding free-form test creation. Ventura Publisher is the can't-go-wrong pick because it can do almost everything its competitors can The features it does not have - search and replace, spelling checker, and mail merge - aren't major publishing detractions and are typically word processing tasks. For optimal operation of Version however, you'll really want to invest

in EMS memo Also available with Ventura is Ventura Publisher Professional Extension, a mustsee consideration for anyone with professional or mathematical typesetting needs It has a powerful table editor and crossreferencing capabilities, and vertical justification will appeal to anyone who works with long, multicolumn documents with many images.

List price, \$895 (includes Bitstream font manager and run-time version of GEMi: Professional Extension is \$595 alone and \$1,295 with Ventura Publisher 2.0. Version tested (2.0) available for the IBM PC, AT, and compatibles running MS-DOS 2.1 or later. Requires 640K of RAM, mouse, hard disk drive. Xerox Corp., 9745 Business Park Ave., San Diego, CA 92131: (800) 822-8221.

7.6 IBM Interleef Publisher, No-vember 7. The performance gap between workstation-based electronic publishing and PC-based desktop publishing narrowed with the introduction of IBM Interleaf Publisher. By offering this product for the 386-based PS/2 Model 70 and Model 80, Interleaf Inc. has given publishing professionals a tool that dramatically expands what you can do with

desktop computers. Interleaf Publisher is definitely not a typical publishing system that simply imports text and graphics and performs post-editing and page composition. Instead, it's a complete turnkey, soup-tonuts publishing dynamo that combines the best of word processing, dramatic graphics, composition, and revision capabilities.

Although it is expensive and a major memory bog, the power, flexibility, and phics capabilities of IBM Interlead Publisher earn it serious consideration for complex or large-scale publishing projects

List price, \$2,495. Version tested (3.0) available for the IBM PS/2 Models 70 and 80, and 386-based compatibles. Requires 6 megabytes of RAM, 40gabyte hard disk. EGA. VGA. 8514/A display: mouse. Versions also available for Macintosh II, Sun, Apollo, DEC, and IBM RT systems. Interleaf Inc., 10 Canal Park, Cambridge, MA 02141; (617) 577-9800. Graphics

8.6 Cricket Draw, June 13 (Macin tosh Target Edition). While maintaining an intuitive user interface, Cricket Draw has expanded on Mac Draw with new capabilities and features, and it has been continuously updated to take advantage of improve-

ments in Apple hardware and software. The editing tools in Cricket Draw are remarkable, especially for the range of commands to modify graphic objects. The program has a bonus for programmers in the form of a Postscript programming environment, complete with on-line Postscript language

Despite its limited support for color Cricket Draw is one of the best Macintosh graphics programs overall. List price, \$295. Version tested (1.1) available for the Macincosh Plus. Requares two floppy disk drives. Cricket Software, 40 Valley Stream Parkway,

Malrem, PA 19355; (215) 251-9890. 8.6 Graftalk, June 6. This general-purpose data charting package, from the makers of Dataease, offers graphing and charting capabilities along with a command language that lets you integrate Graftalk into

database applications. The program supports all the standard charts, each with multiple subtypes, including x-y plots, regression, and logarithms. One very useful feature is the simple command editor that lets you create programs to control slide-show presentations. The charting command language has a thoughtful, time-saving feature: Among the various font sizes and styles available, it selects the one that best

suits the way you've set up the text in a While ideal for users of the Dataer database development system, Graftalk is useful for almost anyone who needs to create high-quality presentation charts List price, \$395. Version tested (5.02)

available for the IBM PC, XT, AT, and true compatibles running MS-DOS 2.0 or later. Requires 256K of RAM, graphics board, and monitor. Dataease Interntional, 7 Cambridge Drive, Trumbull, CT 06611; (800) 243-5123, (203) 374-8000 in

8.2 Pixle, June 6.
This Windows-specific graphics

program takes a brand-new approach to creating business charts and graphs. Instead of entering chart data and operations through fill-in forms, you input that information directly on the chart display. This feature and other clever interface techniques make Pixie a program that even novices can learn to use in a matter

Simplicity doesn't mean simpl a/nors, though. Pixic integrates all three presentation functions - charts, graphs, and drawing - with artistic effects (including a 3-D option) that until now have been available only through com nier and expensive software intended



Datacase offers an optional develop-Ventura Publisher uses style sheets and offers layout and typographic features.

specifically for graphic artists. Pixie makes it easy - even fun - to produce spectacular presentation slides. At a remarkably low price, it's an excellent value

List price, \$195. Version tested (1.02) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 3.0 or later. Requires 512K of RAM (640K recommended), Windows 2.0 or Windows/386, hard disk drive, and mouse. Math coprocessor is also recommended Zenographics, 19752 MacArthur Blvd. Suite 250, Irvine, CA 92715; (714) 851-

8.1 Groph Plas, June 6. Like Pixie, Graph Plus is a Windows-specific all-in-one prescotation

graphics program. It supports plotters, laser printers, dot-matrix printers, and all Postscript output devices, including the OMS Colorscript color Postscript Graph Plus comes with an ex clip-art library, with additional libraries available from Micrografy. The package makes heavy demands on memory but

comes with a run-time version of Winws that uses 30K less RAM.
This full-featured, powerful package is latively easy to learn and use, thanks to the Windows interface and pull-down menus. It offers the best balance we've found between power and friendliness, with excellent technical support. With no

significant drawbacks, it's an excellent value List price. \$395. Version tested (1.1) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 512K of RAM (640K and 286- or 386-based system recommended). Micrografx, 1820 N. Greenville Ave., Richardson, TX 75081; (800) 272-DRAW, (214) 234-1769.

8.1 Hervard Graphice, June 6. Among non-Windows-oriented presentation graphics packages, Harvard Graphics and Freelance Plus (next item)

are slugging it out for first place. The strengths of Harvard are its huse array of charts and graphs and its support for virtually every popular output device, not variously every popular output device, including film recorders. Its Achilles' heel is the drawing module, which has no commands for fitting curves, drawing arcs, or zooming, and whose command screen takes up too much of the drawing

Nevertheless, the program runs fast, and its graphing capabilities are versatile. The extensive symbol library lets you turn any graphic element, even a chart, ioto a symbol. It's the only graphics program we know of that includes a snelling checker.

Harvard Graphics, chosen 1987 Product of the Year in this category by Info World readers, is one of the two best general-purpose non-Windows graphics programs, and we rate it an excellent

value.

List price, \$495. Version tested (2.1) available for the IBM PC, XT, AT, PS/2, and compatibles rounting MS-DOS 2.0 or later. Requires 512K of RAM. Software Publishing Corp., 1901 Landings Drivs, Mountain View. Ca 94039; (415) 962-

7.8 Proclamce Plus, Aunc 6.
This version adds some sorely needed features that turn it into a top tender among non-Windows presen-n graphics packages.

Its menu structure and excellent tuto-rial make Freelance Plus casy to team and use. Although, unlike Pixie, it uses fill-in forms for data entry, the forms are self-

explanatory. Other very useful features include a preview function and a multi-ple-level undo functioo. Editing capabilities are extensive, as are the drawing primitives (although the latter still lack curve-smoothing). The drawing capabilities are supported by solid, basic business-

charting features. Equivalent io strength to Harvard Graphics but with different emphases, Freelance Plus is a close match to its competitor. We rate it an excellent

List price, \$495. Version tested (2.0) available for the IBM PC, XT, AT, PS/2 and compatibles running MS-DOS 2.0 or later. Requires 384K of RAM (512K recommended) and a hard disk. Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142; (617) 577-

7.7 Graph-In-the-Box, June 6. This product, unique among the

presentation graphics programs we tested in 1988, is a memory-resident utility that can instantly analyze whatever numeric data are displayed from almost any Recent enhancements let you produce full-page printouts and on-monitor slide

ows. Compatible with VGA displays. Graph-in-the-Box also outputs directly to desktop publishing programs and many printers and plotters, including Postscript Graph-in-the-Box doesn't do 3-D

charts or word charts, but it does let you create most of the other common types of charts. It has no drawing eapability and only one thin sans serif text font. Don't look for rainbow backgrounds or drop shadows, and don't plan to change the color or weight of graph frames. On the other hand, simplicity spells ease of While other packages are more robust,

Graph-in-the-Box is a valuable addition to anyone's toolkit. At about one-third the price of comparable packages, it rates an excellent value

List price, \$139.95. Version tested (2.0) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later, Requires 256K of RAM, New England Software, Greenwich Office Part No. 3, Greenwich, CT 06831; (203) 625-0062.

7.7 Pixelpoint, June 13 (Macintosh Target Edition) Pixelpaint was the first bit-mapped paint application to tap the full color potential of the Macintosh II. Each image can display up to 256 of the Mac II's 16.7 million col-

ors. It's a fascinating program, with features and functions that make it easy to spend bours noodling with color combinations. However, it's an expensive toy: In addition to the nontrivial sticker price, it prefers a Mac II with 2 megabytes of memory and a color

system For that, you get performance and output quality that are first-rate. Given the relative newness of color printing technology. Pixelnaint supports an im-

pressive number of output devices.

With power, versatility, and ease of use, Pixelpaint is a standout among Mac color graphics programs. List price, \$495. Version tested (1.0) available for the Macintoth II. Requires I

megabyte of RAM, twa floppy disk drives, 8-bit video board. Recommended: 2 me bytes of RAM, hard disk, color monits Supermac Software, 295 N. Bernardo Are., Mountain View, CA 94043: (415) 964-8884.

Integrated Software

8.4 Word Perfect Office, Novem-ber 28 (LANs Target Edition). So-called "groupware" packages, a new item among local area network applications, aim to add an extra dimension of productivity to network workgroups. Few do it better than Word Perfect Office. whose utilities include network mail, a group schoduler, a file manager, a calen-

dar, a calculator, macro and program editors, and a flat-file database — all under a slick DOS shell. Like most network-specific products, WP Office lives on the server, so the

emputers running it don't need any local disk storage. You control the program through keystroke commands, the most common of which are listed in a minimenu on each module's screen. Its unobtrusive nature, superior fea-

tures, excellent performance, and ease of use put WP Office in a position to improve workgroup productivity in a serious way List price, \$495 per server, \$150 per tion. Version tested (2.0) avail for the IBM PC, AT, PS/2, and compati-bles running MS-DOS 3.0 or later. Requires 512K of RAM, network server (Netbios-compatible network or Novell Netware). Word Perfect Corp., 1555 N.

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Technology Way, Orem, UT 84057; (801)

8.1 Microsoft Works, February 29. 1987's Product of the Year in this category, Microsoft Works really does work. The capabilities of the PC version of this integrated software package surpass those of the Macintosh version, with multiple wiodows, Mac-style dialog boxes, and a clever macro-key capability. Modules ioclude a word processor

with spelling checker, spreadshort with graphics, database, and communications. Pull-down menus and good documentation make Works easy to learn and use. It has a few shortcomings. Data transfer among modules is hampered by the lack of "hot links" or split-screen windows. Its flat-file database isn't as powerful as the relational database in rival Ability Plus, but it does let you

produce useful reports, lists, and labels. Similarly, the communications module Works can't compete with Smartcom or Procomm, but it does have some autolog-on capabilities that Ability Plus does not include All in all, Works is nicely designed and well-integrated - ao especially fioe

choice for your portable or laptop List price, \$149. Version tested (1.0) available for the IBM PC, XT, AT, PS/2. and compatibles running MS-DOS 20 or later. Requires 384K of RAM; two floppy disk drives or one 720K floppy drive (hard disk recommended); CGA, EGA, VGA, or Hercules graphics board; Hayes-compatible modem, Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073; (206) 882-8080.

7.6 Ability Plus, February 29.
This program slickly and smooth ly integrates seven functional modules (file manager, word processor, graphics, relational database, spreadsheet, slide show, and communications) around an unglamorous but straightforward library-

style file management screen. The relational database is surprisingly strong and flexible, and the spreadsheet iocludes powerful ooe- and two-way linking features. The spreadsheet links are augmented by "hot links" between modules, which (for example) let you make changes in a spreadsheet and see the nges in the linked text document. Another racy feature lets you flip instantly between any two open files with a single

keystroke. Slighty pricier than many other ioteated software packages, Ability Plus is well worth it

List price, \$259. Version tested (1.01) available for the IBM PC, XT, AT, and compatibles running MS-DOS 2.0 or later. Requires 384K of RAM and Hayescompatible modem. Hard disk recom-mended. Migent Inc., 865 Tahov Blvd., Call Box 6, Incline Village, NV 89450; (800) 633-3444, (702) 832-3700.

### Programming Languages

8.4 Quick Basic 4.0, Fabruary 29.
For a language that was ooce high on the endangered-species list, Basic is enjoying a remarkable resurgence. With Quick Basic 4.0, Microsoft goes beyond mere compilers, offering a sophisticated amming environment that comes the best features of both compilers and interpreters.

The useful new features of QB 4.0 include superior file-control structures and improved data file handling. It has a chery intractive editor and a debuging



Quick Basic 4.0 combines the best features of compilers and interpreters.

mode as the default. No programming language is easy to learn or use until you've learned the first one, but OB 4.0 comes close - if you already know what you're doing. Less experienced programmers will have a lot to learn, but the features of OB 4.0 will

help them. Once you're over the learning bump. many shortcuts and integrated features make OB 4.0 the easiest to use of any programming language environment available today. Its capability to link with other Microsoft languages increases its flexibility and helps make this \$99

program an outstanding value. List price, \$99. Version tested (4.0) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.1 or later. Requires 320K of RAM. Microsoft Corp., 16011 N.E. 36th Way, Box 97017 Redmand W4 98073: (206) 882-8080

8.2 Turbo Pascal, September 12.
Turbo Pascal has come a long way
since Version 1.0. With total sales oow estimated at over 1 million copies, Turbo Pascal is likely the most popular PC language short of Basic. Version 4.0 of Borland's ground-

breaking product removes the 64K limit on program size, making Turbo Pascal a viable option even for large-scale program development In Turbo Pascal, the four steps of the

traditional edit/compile/liok/execute procedure all take place within an integrated eovironment based on a slick pulldown menu system, complete with cootext-sensitive help. The editor uses modifiable Wordstar-like commands and lets you split the window to display source code and its output at the same time The only major handicaps of this fast, powerful, well-integrated, easy-to-use environment are its lack of a built-in sourcecode debugger (oow available in Versioo

5.0) and the inability to provide a code listing with all syntax errors flagged. Still, at \$149.95, Turbo Pascal is an excellent List price, \$149.95. Version tested (4.0) available for the IBM PC. XI PS/2, and compatibles running MS-DOS 2.0 or later. Requires 384K of RAM, two floppy disk drives (command-line compiler requires 256K and one floppy drive). Borland International, 1800 Green Hills

Road, Scotts Valley, CA 95066; (800) 7.8 Microsoft Quiek C, May 23.

Once again, Borland and Microsoft meet bed-dust over your management of the rC lets pages control the appearance of any editional conscious.

543-7543

languages, and once again, it's the users who benefit. While ideal for novices, Microsoft's Quick C also offers a complete, integrated programming environment for professionals. Any implementation of the C language

is only as good as its function libraries and its compatibility with the proposed ANSI standard (i.e., its portability). Quick C implements the full ANSI C standard. providing access to extensions you can turn on and off at will. Quick C also uses the full Microsoft C, Version 5.0 function libraries and compiles almost any program that 5.0 compiles. The advaotage of Quick C over the full

Version 5.0 lies in the way it simplifies the complex and time-consuming steps of writing, editing, compiliog, debugging, recompiling, and editing, Quick C provides not only the editor but also the compiler, debugger, program list manager and libraries Excellent documentatioo and support round out this very

worthwhile program. List price, \$99. Version tested (1.0) available for the IBM PC, AT, PS/2, and compatibles running MS-DOS 20 or later. Requires 512K of RAM, two floppy disk drives. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073: (2051.882.8080

7 Torbo Boste, April 11. Without Borland's Turbo Basi Microsoft would have the field to itself,

and there would be oo Basic wars. Instead, at the very least, Turbo Basic will keep Quick Basic on its toes; but there's more to Turbo Basic than that

The package is typical of Borland's languages: compact, fast, and very easy to use. It lets you produce programs quickly and compile them for use right away Minor limitations io complexity don't detract from its usefulness due to many bandy features, including file, edit, com pile, run, debug, wiodow, and environment options. An especially nifty feature is the capability to pass command lines to a program as if they had been executed

from the DOS promp Turbo Basic and Microsoft's Quick sic are toe-to-toe rivals, and any choice between them will be dictated by taste. We found that Ouick Basic 4.0 has the odee in performance, while Turbo Basic's simpler structure makes it somewhat casier to use.

List price, \$99.95. Version tested (1.1) available for the IBM PC, XT, AT, and compatibles running MS-DOS 2.0 or later, Requires 320K of RAM, Borland International, 1800 Green Hills Road. Scotts Valley, CA 95066, (800) 543-7543.

### Spreadsheets

9.3 Excel for the PC, February 1.

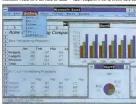
Excel for the PC represents the state of the art in spreadsheet design: a position recognized by InfoWorld's readers, who voted it Spreadsheet Product of the Year for 1987 and overall MS-DOS Software Product of the Year. Although extensive (and expensive)

hardware is necessary to make full use of Excel's power, users of 386- or fast 286-based systems should find Excel all the spreadsheet they'll need for some time to come

The program's graphics orientation makes for somewhat sluggish performance on slower machines but also offers unprecedented control over the on-screen appearance of your spreadsheets

With dynamic data exchange between worksheets and impressive linking and display capabilities, this dazzling, powerful, well-rounded program is definitively the spreadsheet of the future today - if you have the hardware to make it go.

List price, \$495 (upgrade from Multiplan, \$250). Version tested (2.0) available for the IBM PC AT, PS/2. Compag Deskpro 366, and 100 percent compatibles running MS-DOS 3.0 or later. Requires 640K of RAM, hard disk



rive, graphics display, Windows 2.0 or wz/386 (run-time module inclu ed), Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073; (206) 882-8080.

8.2 Excel for the MacIntosh, De-cember 12 (also reviewed August 15). Microsoft Excel for the Macintosh is an evolutionary product, not a revolu-tionary one. The current version affirms the program's leadership among Macin-

tosh spreadsheets. Version 1.5 fixes some bugs in the previous version (1.06), speeds it up, and adds some new features most important among full support for Multifinder, a new Links command,

port for color printing, and support for files in various Lotus 1-2-3 and PC Excel has enough analytical features ath, statistical, database, financial, trigonometric, and special-purpose) to

justify a separate manual for them. The macro language lets you customize the ogram's analytical features to your heart's content. This mature product is a strong upda

of an already strong program. It's fast, feature-rich, and easy to learn and use; in all, an excellent valu List price, \$395. Version tested (1.5) ailable for the Macintosh 512E, Mac Plus, Mac SE, and Mac 11. Requires 512K of RAM and an 800K floopy drive. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073; (206)

8.0 Quattre 1.0, February 1.
This very appealing product was designed to tempt Lotus 1-2-3 users with some significant improvements - and to make the switch easier by incorpo nal command interface identito 1-2-3's. Yet, far from being a 1-2-3 clone, Quattro incorporates most of the advanced features found in products costing twice as much. Although Quattro doesn't offer the

background-recale mode that is found in Excel, it does use minima recalculation techniques so an enti spreadsheet doesn't need to be recalculat-Other features that improve on the d

facto 1-2-3 standard include auto-recording macros, new macro debugging capabilities, vastly superior graphics, control over screen colors, and easy installati The SQZ file-compression utility is built

The program's major disadvantage is its lack of spreadsheet consolidation and linking features (rumored to be addressed in the upcoming Quattro 2.0). The pre-sent version remains a powerful, fullfeatured, and likable integrated sprea sheet that doesn't make outrageous demands on hardware. We rate it an excellent value

List price, \$247.50. Version (1.0) available for the IBM PC, XT, AT, and compatibles running MS-DOS 2.0 or later. Requires 512K of RAM, two flop, disk drives (a hard disk is recommend and a graphics adapter for viewing graphs. Borland International, 1800 Green Hills Road, Scotts Valley, CA 95066; (800)

### Spreadsheet Add-Ins And Add-Ons

8.9 SQZ Plus, June 13.
This file-compression program works nearly transparently, reading and

writing compressed workshort files, making room for more files per disk as well as faster file transfers. Typical files can be shrunk to about 15 percent of their

The "Plus" in the name refers to two new functions in Version 1.10: a filebackup add-on and a keystroke recorder. Although the original SQZ is a good buy if you work with a lot of big spreadsheets, these two new features make SOZ Plus almost irresistible

List price, \$99.95, Version tested (1.10) available for the IBM PC, XT, AT, and compatibles running MS-DOS 2.0 or later. Requires 120K of RAM and Lotus 1-2-3, Release 2.01 or later. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014-(408) 253-9600

8.8 Altweys, December 19. 8.8 In a year jam-packed with classy 1-2-3 add-ons, this late entry makes a graceful splash. If you're a 1-2-3 user who turns green with envy at the sight of Excel output, Allways offers multiple type fonts and sizes, shading, outlining, boxes, and even integrated graphs - all the amenities needed to get you and your laser printer reacquai

Along with its formidable page layout features, Allways allows you to generate text-only overheads; and, though the process is circuitous, you can even create organizational charts using line and box commands. Like many of the other addons for 1-2-3. Allways is something of a memory guzzler, but the product's excelormance demands that the me ory and expanded memory will cut RAM

Overall, this easy-to-learn product is not only an excellent value but an swered prayer for the bored and limited 1-2-3 us

List Price, \$149.95. Versie (1.0) available for the IBM PC, XT, AT, PS/2, and compatibles. Requires 120K of RAM, a hard disk. MS-DOS 2.0 or later, and Lotus 1-2-3. Release 2.0 or later (a or is optional but necessary for WYSIWYG display). Funk Software Inc., 222 Third St., Cambridge, MA 02142: 66171 497-6339.

8.6 Workshoot Utilities, June 13. This 1-2-3 life-extender includes a grab bag of handy utilities packaged in vo separate add-ons: Fileworks and Cellworks.

The Fileworks add-on provides file management functions on a par with those of stand-alone DOS shells, and also offers file compression for worksheets and all other kinds of files. Since the compression routines weren't optimized for 1-2-3 files, the degree of compression is less than that of SQZ Plus. Fileworks shrinks files down to 35 or 40 percent of their original size.

The Cellworks add-on is the ultimate formula editor. Its four-line editing window makes it easy to evaluate formulas one line at a time. Menus provide @ functions and operators, and syntax errors are flagged in blazing color.

Documentation, ease of learning and se, and error handling for the Worksheet

tilities are all excellent, as is its value. List price, \$99.95. Version test (1.01) available for the IBM PC, XT, Al PS/2, and compatibles running MS-DOS 2.0 or later. Requires 185K of RAM and Lotus 1-2-3, Release 2.0 or later. Funk Software, 222 Third St., Cambridge, MA 02142; (800) 822-3865, (617) 497-6339.

8.4 3D Graphics, June 13. This 1-2-3 add-on does pro what its name implies: It adds anoth dimension to the spreadsheet's graphics

capability. While typical graphs display data on a single plane, 3D Graphics does it in three dimensions, encouraging new insights into the relationships among groups of data.

The program stores graph information in extental files and displays it in the form of surface charts as well as several kinds of line and har charts. It runs fast, starting to

plot even complicated graphs almost immediately Although certainly no substitute for products like Boeing Calc, it's still an impressive 1-2-3 enhancement and easy

to learn and use. At under \$100, it's also an excellent val List price, \$145 (as of January 1). Version tested (1.01) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 64K of RAM and Lotus 1-2-3, Release 2.0 or later or any version of Symphony. Intex Solutions Inc., 161 Highland Ave., Need-

ham, MA 02194; (617) 449-6222. 8.4 Speedup, June 13. Speedup is one of two add-ons (the

other is Learn) that Lotus has included free of charge with 1-2-3 since October 1987. Speedup accelerates the operation of 1-2-3 through a minimal-recalculation routine that operates only on the cells in a spreadsheet that are affected by a change, In most cases, the speed increase is significant; however, if a spreadsheet has many dependent cells, Speedup's cellanalysis overhead may result in slower than-normal recalculation.

The add-on comes bundled as part of the Lotus Value Pack with Learn (a macro utility), EGA and Postscript st port for 1-2-3, and a utility for the removal of copy protection. Given the price of this package, how could it be ther than an excellent value? List price: no charge. Versi

(1.0) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 120K of RAM and Lotus 1-2-3, Release 2.01 or later. Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142; (617) 577-

8.0 20 Graphics, June 13.
The built-in graphics capabilities 1-2-3 are, at best, limited. The program lacks several fairly common types of graphs, and the ones it does support impose various restrictions, particularly with regard to the number of ranges that

can be plotted. 2D Graphics adds several kinds of charts to 1-2-3's repertoire, including dual y-axis charts, combined bar and line graphs, polar and radial graphs, circles, and high/low/close charts, with up to 12

ranges and in a variety of col As with its stablemate 3D Graphics, chart data is stored in external files. Although the menus in 2D Graphics can be confusing, a little experimentation will yield immediately useful results. The program is well-documented and works with Symphony as well as 1-2-3.

List price, 3145. Version tested (1.0) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 64K of RAM and Lotus 1-2-3, Release 2.0 or later or any version of Symphony. Intex Solutions Inc., Highland Are., Needham, MA 02194; (617) 449-6222

7.9 Finsh-in, June 13.
This innovative add-on provides

plete search and replace function within a 1-2-3 worksheet. It also lets you pop up a second worksheet in an adjustable window from which you can opy data - without losing the first

Flash-In's search capability can exto worksheets stored on disk.

Another feature, very handy if you have a graphics monitor, gives you a hird's-eve view of an entire worksheet on a single screen. A third Flash-In function lets you select range names from a me whereupon the program autom. highlights the ranges on the zoom display Flash-In is very easy to use, with

omplete on-line help in the star Lotus 1-2-3 format. It is an excellent value and well worth a look List price, \$99.95. Version tested (1.0) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or



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later. Requires 64K of RAM, a hard disk drive or floppies, and Lotus 1-2-3, Release 2.0 or later. PC Publishing Inc., 1801 Avenue of the Stars, Los Angeles, CA 90067; (800) 634-4555, (213) 536-3630.

### 7.9 Silverede, June 13 (also re viewed February 15).

verado is by far the most or database add-on for 1-2-3 that InfoWorld has tested. For one thing, its menu-driven report generator is excellent, providing full control over output. (The masochis can use macros and @ functions to build

tomized reports.) Easy access to detail, summary, and cross-tab reports make Silverado a pleasure to use. The cross-tah report in particular is very well-suited to providing sick-and-dirty summaries of data.

Perhaps the most useful aspect of Silverado's reporting capability is that it lets you expand a summary or subtotal ort into a detail report, and vice versa The level of detail in printed reports corresponds to that on the screen.

The add-on's menu-driven queries are ach more powerful than those in native 1-2-3. Although Silverado's operation isn't always as smooth as it might be (some operations require extra keystrokes), it is the most complete of the 1-2-3 database add-ons, and one of the

best bargains in the group.

List price, \$149. Version tested (1.0) available for the IBM PC, XT, AT, PS/2. d true compatibles running MS-DOS 2.0 or later. Requires 512K of RAM and Lotus 1-2-3, Release 2.0 or later. Com puter Associates, 1240 McKay Drive, San Jose, CA 95131; (408) 432-1727.

### 7.8 Sideweys, June 13. This product has been around for

quite a while but only recently appeared as a 1-2-3 add-on. It lets you use your printer's eraphics mode to print text vertically (in landscape mode) instead of horizontally (portrait mode) - a capability ideal for wide spreadsheets in which you don't want the output to extend across multiple pages.

The inevitable trade-off — sl

printing - is a small price to pay for visual economy and, face it, the pleasure of surprising people who didn't know that dot-matrix printers could do such things. In addition to sideways printing Sideways also makes it easy to print selected ranges of data with enhancements such as underlining and holdface type.

The Sideways package contains fo versions of the product: add-ons for 1-2-3 and Symphony, a stand-alone version for 1-2-3 (including Version 1A), and a program that works with output from other programs that create ASCII files. Even laser printers can't always pro-duce output like that of Sideways. If printing speed isn't an issue, Sideways is a great adjunct to any dot-matrix printer.

List price, \$69.95. Version teste 21) available for the IBM PC, XT, A PS/2, and compatibles running MS-DOS 2.0 or later. Requires 80K of RAM and Lotus 1-2-3, Release 2.0 or later. Funk Software, 222 Third St., Cambridge, MA 02142; (800) 822-3865, (617) 497-6339.

### Tools Utilities And Environments

8.7 Dosqviow/QEMM, May 9. The Desqview multitasking operating environment, which runs very well on IBM ATs, performs even better on 386-based systems when used in conjunction with the Quarterdeck Expanded Memory Manager (QEMM).
Denview (wheth Various 24/ 488



Desgriew provides bigger windows and easily switches between applications

InfoWorld's 1987 Product of the Year in the operating system/environment cutegory) takes advantage of the 386's virtual mode to provide bigger windows for running larger applications, with resulting gains in compatibility and noninterfer

In InfoWorld's tests, Desgview had no problems running background comcations tasks, continuing to run fore ound applications with no loss of speed vitching between applications is practically instantaneous, and graphics applicaions redraw with no noticeable delay. Data integration is good, and flexibility is

The addition of OEMM, which comes with its own documentation, does nothing to impair Desoview's operation or performance. The two programs provide impressive speed, compatibility, and flexibility, and their modest price makes them an excellent value

List price, \$129.95 (Desgriew 2.01), \$59.95 (QEMM 4.1). Available for the IBM PC AT, PS/2, and compatibles running MS-DOS 2.01 or later. The amount of RAM required varies, and a hard disk is recommended. Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, CA 90405; (213) 392-9701

### 8.4 Norton Comm The beauty of Norton Commander ste

from the fact that it's a full-featured DOS ell that doesn't restrict access to the DOS prompt. In other words, you can have Norton Commander running all the time yet only use it when you want to. "Point and shoot" is a very not description of the user interface, which lets you perform all the common DOS functions. It lets you display two directories at once, each in its own window, with full control over file sorting.

It also lets you develop pop-up applications menus, either separately for each directory or as one global menu. The latest version includes a file editor and a file viewer, which lets you view the contents of text, spreadsheet, and database files. File-comparison and filefinding utilities round out the nackage Norton Commander is a near-perfect duct and one of the best all-around DOS shells available. Loaded with features and extremely powerful, it remains very easy to learn and use - a virtually indispensable tool for any PC user. List price, \$89. Version tested (2.0, ulubie to the LIM PC, XT, AT, PS/2 and compatibles running MS-DOS 2.0 or later. Requires 138K of RAM (resident) or 13K (reloadable) and two floppy disk Peter Norton Computing Inc., 2210 Wilshire Blvd., Suite 186, Santa Monica, CA 90403; (213) 319-2000.

### 8.2 Bayond-Bat, October 17. This DOS extender is a sure cure for everyone frustrated by the limitation and awkwardness of DOS batch files. It

overlays your operating system with a command filter and a script processor to provide a full-fledged programming language, available at the DOS prompt, that you can use to create batch files, set up custom front ends, or write entire Beyond-Bat programs are as powerful

as many programs written in Basic or Pascal. You can cram them full of variables and functions, manipulate records and files, use complex program-ming logic, and even create custom menus and help screens that incorporate scrolling text and point-and-shoot The power and versatility of this

ackage - power and versatility that DOS should have had to start with - are nited only by the user's programming skill. It should be quite a while before even experienced programmers run out of features to exploit: meanwhile. Beyond-But should be in the repertoire of every system manager and batch-file writer List price, \$99. Version tested (1.0) available for the IBM PC. XT. AT. PS/2. and compatibles running MS-DOS 2.0 or later. Requires 5K to 165K of memory, depending on application, Relay Communications, 41 Kenosia Ave., Danbury, CT 06810; (203) 798-3800

8.1 "Laplink Plue, October 10.

"Laplink" has become almost a generic term for intercomputer filetransfer programs, and Laplink Plus is the true scion of this ground-breaking family

of utilities from Traveline Software Inc. This program contains two functional modules; one for file tranfers and one for device sharing. Laplink Plus lets you transmit entire disks full of files or just a selected few files. The menu-controlled package, which can be run from either a hard or floppy disk, includes a 6-foot serial cable that has both 9- and 25-pin connectors at each end. If a cable is disconnected and reconnected during a transmission, the transmission stops and attention of the sale

For anyone who needs to transfer data regularly (say, between desktop and portable systems) or move data between different-size disks, Laplink Plus is a competent, graceful, easy-to-use must. List price, \$139.95. Version tested (2.0) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Laplink Plus requires 192K

per machine (32K on controlling machine, 23K for drivers). Traveling Software Inc., 18702 N. Creek Parkway, Bothell, WA 98011; (206) 483-8088. 8.1 Sidekick Plue, May 16. Four years ago Borland's original

Sidekick utility package gave users a taste of multitasking. Today's Sidekick Plus retains all the features of its parent notepads, calendars, calculators, and a sone dialer - but revamps them completely and adds major new ones such as an outliner, a DOS shell-like file manager, a communications capability, and even a pop-up arcade game. The product offers an unparalleled

number of customization options, letting you fine-tune the menus and commands However, its most significant innovation lies in memory usage. With Sidekick Plus, access to all of the utility features costs as little as 72K of conventional RAM. This advanced RAM-resident desktop

anizer, although priced much higher than its predecessor, packs a tremer ount of power and flexibility. Even without an auto-save feature for volatile data in RAM, it's still an excellent value, Used intelligently, its return in productive ity can be impressiv

Last price, \$199.95. Version test (1.00A) available for the IBM PC, XT. AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 384K of RAM. a modern for communications, and a hard disk, RAM disk, or EMS. Borland International, 1800 Green Hills Road. Scotts Valley, CA 95066: (408) 438-8400.

7.9 Overdrive, July 4.
Assembling documents and managing them are tedious tasks at best. Overdrive, a Word Perfect add-on, relieves the drudgery by automating the

creation of forms.

The program comes with 75 pre-made customizable business and legal templates, which can be linked through data entered for all the forms from one entry screen. Two-thirds of the pre-made documents are general legal/business agreements: the others include basic business cover letters, envelopes, and air bills for Purolator and Federal Express. overall forms library holds up to 1.250 documents.

Overdrive recognizes Word Perfect text files and lets you include them in final assembled documents. It automatically creates merge and macro files, and prints documents through Word Perfect. Word Perfect users who do a lot of repetitive work will find Overdrive below standardize and index documents, and saves time and effort. The program is somewhat complex, but excellent documentation makes it easy to learn and use We recommend this program.

List price, \$99.95 (\$193 for the net-work version). Version tested (1.0) avail-able for the IBM PC, AT, and and compatibles running MS-DOS 2.0 or later. Requires 312K of RAM, Word Perfect 4.0 or later, and a hard disk. Turbosoft, 23811 Chagrin Blvd. Suite 260, Cleveland, OH 44122; (800) 284-

7.8 Hot, July 18.

Hot, from the creators of the Xtree d disk vice transgement program, is in

# Simply Accounting is simply magnificent

### InfoWorld, March 14, 1988...

"Simply Accounting lists for \$349, which gets you all six accounting functions. Other popular entry-level



accounting systems for the Mac include Plains & Simple, priced at \$395, and Back to Basics at \$199.

Of course, these competitors provide only three accounting functions, compared to the six functions of Simply Accounting. You can get these other accounting functions with higher level systems from Great Plains and Layered Inc., but they hit your wallet for \$600 or so a module.

Not every company will want to automate the additional functions of inventory, job costing, and payroll. But if you do, Simply Accounting delivers the goods in a cost-effective package.

Simply Accounting is one of the top choices for small businesses who want to start Maccountino."

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- prior period positing
   produces full audit trail

### Payables/Receivables • uses open invoice method

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### Pavroli

 uses built-in payroll formulas; no usermantained lables
 automatic federal and state deductions
 accumulates OTD, YTD, W-2, 940 and

### Inventory

- fully integrated with payables and receivables
- uses average weighted cost method
   handles adjustments and transfers

### Inhenst

- distributes revenue or expense to projects
   control control
- paycheck distribution includes the company's portion of FICA, SUTA a Disability to receive the company's portion of FICA, SUTA a

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   Reports can be displayed, printed or
  - exported
     Exclusive Comfort Guarantee assures
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 impressive and useful DOS menu maker - and a lot more. The package consists of the full program and two run-time modules for use with finished menu systems on other computers. The basic menu-construction program produces somewhat limited results. For niceties such as password protection or a provision for user input, you need the editing module. Other supporting features include a system-use tracking program, a small word process-ing program, a file-finding utility, and a

endar, datebook, ealeulator, and screen-blanker. Hot's own pop-up menus and men scripts let you control your system to the 11th degree of detail, and the menus the program produces are attractive, easy to use, and very fast. We recommend this product, especially for offices with several

List price, \$179 (with two nun-time modules: additional modules are \$49.95 each). Version tested (4.0) available for the IBM PC, XT, AT, PS/2, and compati-bles running MS-DOS 2.1 or later. Requires 512K of RAM and a hard disk Executive Systems/Xtree Co., 4330 Santa Fe Road, San Luis Obispo, CA 93401. (805) 541-0604, (800) 634-5545 outside

7.7 Microsoft Windows/386, May 9 (also reviewed January 18). /indows/386 is the version of the Microsoft Windows multitasking operating environment customized for 386based systems. In many respects, this is the version that runs the way Windows should: fast, flexibly, and compatibly. In multitasking, Windows/386 lets you set applications to run in foreground. in background, in either, or in "exclusive" mode (in which all other applica-tions are suspended). In Info World's tests,

operations slowed down significantly when multiple applications ran simultaneausly. In most other respects, Windows/386 is virtually identical to Windows 2.03. The "virtual machine" mode of Windows/386 improves data integrity considerably, so crashing an application in one window doesn't affect those in other windows. TSR applications were another

story, though, and occasionally hung the On the whole, with better compatibility, additional functionality, better speed, and much more flexibility, Windows/386 is a marked improvement over Windows

2.03 and a very good value.

List price, \$195. Available for the IBM
PC. XT. AT. PS/2, and compatibles
running MS-DOS 2.0 or later. Requires 512K of RAM, a hard disk drive, and a CGA, VGA, EGA, or Hercules graphics er. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA

### 98073; (206) 882-8080. Word Processing

8.0 Word Perfect 5.0, Septem 26 (also reviewed June 20). rong, fast, and flexible, Word Perfect 5.0 is the office/professional word processor of 1989 and a major improvement over its predecessor (Version 4.2 which InfoWorld readers voted 1987

Product of the Year in the MS-DOS word processing category). The improvements start with completely revised documentation and conelude with enhancements that support laser printers, a wide range of multiple-column displays, and a variety of graphics functions. Word Perfect 5.0 can import graphics formats from a wide range of other products, including Latus Other Software 1-2-3, Autocad, GEM, and Mac Paint. A

30-image clip-art library comes with the Macros, once a set of simple keystroke shortcuts but now a fully developed mini-programming language, hone 5.0's competitive edge through automation of

many repetitive tasks. Power, flexibility, and ease of use for both simple and complex documents, all at a competitive price, make Word Perfect 5.0 an excellent value.

List price, \$495. Version tested (5.0) available for the IBM PC, AT, and compatibles running MS-DOS 2.0 or compatibles running Ma-2003 2.0 dister. Requires 512 of RAM. A hard disk is recommended. Word Perfect Corp., 1555 N. Technology Way, Orem, UT 84057: (801) 225-5000.

7.7 Wordstar 2000 Plus, Septem-11). Wordstar 2000 bas changed over the years. What was once a clumsy, slow, limited-range program is now a fast, slock, and serious competitor among professional word processing pro-

Release 3.0, Personal Edition offers a much expanded list of features, significantly improved performance, excellent documentation, and superior support. The main program, in which the strong editing and formatting capabilities reside, is augmented by a set of utilities that handles mail lists, form letters, indexing, and telecommunications, and also by a collection of stand-alone programs for graphics, page-size text displays, outlines, d forms.

Support for laser printers, including Hewlett-Packard and Postscript fonts, rounds out the program, whose excellent performance isn't hindered by the lack of a common interface for the ancillary

Although priced about the same as Autosoup priced about the same as rival high-power office word processing packages, the range of features in Wordstar 2000 Plus puts it well ahead of the pack. Wordstar 2000 Plus is an excellent value.

List price, \$495. Version tested (3.0, Personal Edition) available for the IBM PC, XT, AT, PS/2, and compatibles running MS-DOS 2.0 or later. Requires 384K of RAM (512K for graphics and other included programs) and a Hayes-compatible modem. A hard disk is

recommended. Micropro International Corp., 33 San Pablo Ave., San Rafael, CA 94903; (800) 669-1200, (415) 499-1200.

Pier 30 0 Color P I

9.1 Macintax Taxview, March 14.
Among the stand-alone taxpreparation programs InfoWorld tested, Macintax Taxview (the federal version) is the easiest to learn and use. Although simple and straightforward, it's amazing-

ly sophisticated. It doesn't iust follow the structure of IRS forms but actually duallower them on the screen letting you fill them in just as you would the paper

IRS instructions for each line item are just a double mouse-click away. If you calculate an entry amount on a worksh or on another schedule, Macintax Taxview automatically links that form with others and with the 1040. We wish more tax-preparation programs worked this way.

Printing remains a strong Maci feature, with reproduction of all IRS forms, including the 1040, on plain paper using either a Laserwriter or an Image-There is no question about it. Fast,

accurate, and friendly, Macintax Taxview the progam to buy. This program almost makes income tax preparation List price, \$119; upgrade, \$55. Version

tested (federal version) available for the Macintosh 512K, Mac Plus, Mac SE, and Mac II. Requires one floppy disk drive (external drive recommended). Saftview Inc., 4820 Adohr Lane, Suite F. Camaril lo, CA 93010: (800) 622-6829, (805) 388 2626 In C4

Mathematics, December 12 (Macintosh Target Edition). This math package for the Macintos made a well-deserved splash this year thanks to its bold disregard for the limitations of mathematical software.
Unlike most other math packages, Mathematica does numeric as well as graphic and symbolic math. It can plot functions in two or three dimensions, and can evaluate complex symbolic ex-

pressions. Featuring 400 built-in math functions, Mathematica uses both con-ventional, handwritten math notation and C programming style. If your abilities and needs in math are limited to the kind of work your spreadsheet can handle, then this is not likely to be the package for you. However, Mathematica is easy to learn and use, and its excellent performance and value make it a must for the mathematicians, scientists, and engineers for whom it is

List price, \$495 (standard version) \$795 (Mac II version). Version tested (Mac II) available for the Mac Plus or later with at least 2.5 megabytes of memory and a hard disk drive. Wolfram Research Inc., P.O. Box 6059, Champaien, IL 61821: (217) 398-0700.

8 Time Line, May 23.
The design of this project management package shows an excellent understanding of how projects evolve - and also consideration for the people with

different experience levels who will most likely be using it. Time Line lets you plan projects through outlining, Gantt charts, and through outlining, Gantt charts, and resource scheduling. With LIM EMS 3.2 or 4.0 expanded memory, it can handle up to 1,600 tasks. The spreadsheet-style user interface is augmented by function keys, and there is a very handy multilevel undo function. The basic display provides enough task information to reduce reliance on screen reports. Presentation-quality PERT network diagrams are possible through an extra-cost graphics

Time Line wasn't the first to offer Time Line wasn't the first to offer features such as outlining and an export capability for mainframe planning pro-grams; however, it implements those features and integrates them with its own planning and reporting options in a high-performance package that's strikingly casy to use.

List price, \$595 (single user). Version tested (3.0) available for the IBM PC, AT, and compatibles running MS-DOS 2.0 or later. Requires 640K of RAM and a hard disk drive. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9600.

7.9 Systet/Sygraph, September 19.

Systat has long been one of the few comprehensive statistical-analysis pack-ages that run on a dual-floppy PC, with unsurpassed analytical accuracy and

breadth. Version 4.0 of Systat is a maj upgrade. Systat still runs on dual-floppy systems, but its separate modules are now directly linkable. The new Macro module provides a Basic-like command language for customized analyses. There is a new very fast sorting module and also a popup command editor and a spreadsh editor. But the brightest addition to this program is the Sygraph omnibus graphics

package (which is also available Although it is command-orient rather than menu-oriented, and therefore somewhat complex, Systat/Sygraph is almost infinitely flexible, with exotic leading-edge data-graphing and dataanalysis capabilities, including point-

The Systat/Sygraph combo is a class t, combining a powerhouse numbercruneher with a staggeringly wide-ranging graphics package. We rate this product an

excellent value List price, \$795 (Systat plus Sygraph. Versions tested (Systat 4.0, Sysraph 1.0) available for the IBM PC. AT. PS/2, and compatibles running MS-DOS 2.0 or later, Requires 640K of RAM (256K and 512K versions optional) and two floppy disk drives. Systat Inc., 1800 Sherman Ave., Evanston, IL 60201; (312) 864-5670.

- Compiled by Barbara Clifford

The Mathematica package performs numeric as well as graphic and symbolic math

### HARDWARE

### **Desktop Computers** 364-BASED SYSTEMS

# 8.6 Everax 40ep 386/28, November 14 (also reviewed November 7). The performance of this 25-MHz system is superfairle. In fact, it's the fistest 386-based machine we tested in 1089.

in 1988 One reason is that instead of Intel's 82385 cache controller chip, the Step 386/25 uses a proprietary scheme (AMMA, Advanced Memory Manage ment Architecture) that lets cache me ry expand to 64K. Caching software and a RAM disk setup routine are bundl along with the hard disk diagnostics, DOS 3.3, and GW Basic. The front panel contains an eight-character LED status display, a speaker switch, and a threeposition speed switch.

With speed, expandability, and com-petitive pricing (starting at \$6,399 for 1 megabyte of main memory and 64K of cache RAM), this Everex system is serious hardware. List price, \$11,396 (as configured) Model tested includes 25-MHz 80380 processor, one serial port, one porallel port; eight expansion slots (one 8-bit, six

16-bit, one proprietary 32-bit); support for 80387 or Weitek 3167 coprocessor; 200watt power supply; battery-powered clock/ealendar; EGA board and color monitor; 160-megabyse CDC hard disk, 1.2-megabyte 5%-inch floopy drive: 4 megabytes of RAM; 64K of RAM cache; MS-DOS 3.3. Everex Computer Systems Division, 48504 Kato Road, Fremont, CA 94538: (800) 356-4283.



8.6 Proteus 386/25GT, November 14. This relatively inexpensive 386 system

supports a lot of RAM for the money and comes with ample software, including DOS, utilities for the scrial/parallel board, and drivers for the VGA board. It comes in desktop configuration, with five half-beight drive-mount posi-tions and eight slots, which belp earn an excellent score for expandability. The outstanding CPU and disk drive performance is augmented by solid workmanship, competent and comprebensive technical support, on-site service, and a

very competitive price.

List price, \$9,110 (as configured).

Model tested includes 25-MHz 80386 processor; two serial ports, one parallel port; seven expansion slots (two 8-bit, four 16-bit, one proprietary 32-bit); support for 80387 and Weitek 3167 coprocessors; 200-watt power supply; battery-powered clock/calendar; VGA board and color monitor, 90-megabyte CDC ESDI hard disk: 1.2-megabyte 5%-inch floppy drive: 4 megabytes of RAM; 64K of RAM cache, Proteus Technology Corp., 377 Route 17, Airweit 17 Center, Hashrouck Heights. NJ 07604; (800) 782-8387, (201) 2888629 8.5 Micro Express ME 388-25, November 14.

While midrange in performance among this group of extremely fast machines, the ME 386-25 benefits from quality workmanship, a low price, and a full list of features. DOS and disk management software are bundled, and its standard 1 megabyte of RAM can be expanded to 8 megabytes on the motherboard. Its ESDI ive means conflict with IBM's Token Ring software, but otherwise software and hardware compatibility were rated ex-

Limited documentation and an exposed reset switch are the only disadvan

tages to this sturdy, relatively inexpensive system, which we rate an excellent value.

List price, \$7,999 (as configured).

Model tested includes 25-MHz 80386 processor one serial port, one port; eight expansion slots (one 8-bit, six 16-bit, one proprietary 32-bit); support for 80387 and Weitek 3167 coprocessors; 220-watt power supply; battery-powered clock/calendar; EGA board and color monitor; 170-megabyte Micropolis ESDI hard disk; 1.2-megabyte 5%-inch floppy drive; 4 megabytes of RAM; 64K of RAM cache. Micro Express, 2114 S. Grand Ave., Santa Ana, CA 92705; (714) 662

8.3 Heriz 386/25, November 14.
This rugged midrange desktop system sits near the high end of the price range for 25-MHz 386-based systems, but its heavy-duty metal construction and second fan make it an ideal machine for less-than-ideal locations

iess-tinan-ideal locations.

As a 25-MHz 386, its CPU speed was unexceptional, but it passed the Info-World hardware and software compatibility tests with flying colors. The system arrived preconfigured and ready to run, and unrelianment design unexpect to the color was a control to the color was a color and supplementary devices were easy to add. With an eye toward Unix applications, the Hertz 386/25 supports up to 24

megabytes of RAM.

Hertz handles technical support for the system, and Intel provides on-site service and repairs.

Balancing unspectacular performance and a fairly high price against extremely good workmanship and thoughtful de-sign, we rate the Hertz 386/25 a good

List price, \$9,795 (as configured). Model tested includes 25-MHz 80386 processor; two serial ports, one parallel port; eight expansion slots (one 8-bit, five 16- bit, two 32-bit); support for 80387 and Weitek 3167 coprocessors; 230-watt power supply; battery-powered clock/calendar; VGA board and color monitor; 170megabyte Micropolis ESDI hard disk; 1.2-megabyte 5%-inch and 1.44-mega byte 3%-inch floppy drives; 4 megabytes of RAM; 64K of RAM cache. Hertz Computer Corp., 325 Fifth Ave., New York, NY 10016; (212) 684-4141.

8.0 AST Promium 386, May 2. Its CPU test scores place this 20 MHz system midrange between the 20-MHz PS/2 Model 80 and the Compaq Deskpro 386/20, earning the AST

chine a rating of very good in speed. Userselectable operating speeds (down to 4.77 MHz) and OS/2 compatibility contribute to a score of excellent for software competibility.

According to AST, the system Smart-Slot Architecture provides most of the functionality of IBM's Micro Channel Architecture (including support for multiple processors on the same bus) white machines

Fine performance, excellent docu-sentation, and solid support make the remium/386 a good value despite its

List price, \$10,839 (as configured). Model tested includes 20-MHz 80386 processor; two serial ports, one parallel port; seven expansion slots (two 8-bit, four 16-bit, one proprietary 32-bit); support for 80287 and 80387 coprocessors; 220-watt power supply; battery-powered clock/calendar; EGA board and color monitor, 90-megabyte CDC ESDI hard disk: 1.2-megabyse 5%-inch floppy drive; 4 megabyses of RAM. AST Research, 2121 Alton Ave., Irvine, CA 92714; (714)

### 8.0 Introdics Master Seri The Master Series 386 is a typical 386-

based system in many ways, with the speed of its CPU roughly the same as that of the 16-MHz PS/2 Model 80, (which earns the system a score of very good in this category). Its 70-megabyte Miniscribe drive was

satisfactory in sequential-access speed, but it was faster in random-access speed than any other 386-based system drive we tested (though it has been eclipsed since then by 25-MHz models). User-selectable operating speeds (down to 6 MHz) boosted the Master Series 386 to a score of excellent for software compatibility. (OS/2 compatibility is not claimed.) It also benefits from a superb technical support staff.

This system offers full compatibility and fine performance at a slightly belowaverage price; we rate it a good value. List price, \$5,433 (as configured). Model tested includes 20-MHz 80386 processor; one serial port, one parallel port, one game port; support for 80287 and 80387 coprocessors, 200-watt power supply, battery-powered clock/cale EGA board and color monitor; megabyte Miniscribe ESDI hard disk. 1.2-megabyte 5%-inch floppy drive; 4 megabytes of RAM. Intronics Computer Corp., 1212 Knoxville St., San Diego, CA 92110: (800) 422-3366, (619) 276-3700.

7.9 ALR Flexcache 25386, November 14 (also rev August 15). The Flexcacbe 25386 is built like a Sberman tank and runs like blazes. Its 26-inch-tall metal case contains second fan, intended specifically for addin boards. No longer the low-price leader among 386 systems, it still stands strong against slower, higher-priced, and weak

The befty tower-style Flexcache coe with 2 megabytes of dynamic RAM, expandable with memory boards to 14 megabytes. The bundled software includes network drivers, with a patch that lets the Flexcacbe's ESDI drive run with Novell Netware. Overall software com patibility was very good, and hardware compatibility was excellent

Intended mainly as a file server or Xenix master, the Flexcache has a few physical inconveniences for single users. but nothing that keeps us from rating it a List price, \$9,499 (as configu

thout monitor). Model tested includes 25-MHz 80386 processor; one serial port, one porallel port; eight expansion slots (one 8-bit, six 16-bit, and one 32-bit); support for 80387 coprocessor; 200-на power supply; battery-powered clock/calendar, 16-bit VGA board and color monitor; 150-megabyte ESDI hard disk; 1.2-megabyte 5%-inch floopy of 2 megabytes of RAM; 64K of cache RAM Juniord Legic Reservoir Inc., 5401 Jeronimo, Irvine, CA 92718; (800) 4444257, (714) 581-6770.

7.7 Everex Step 386/20, May 2.
Multiple operating speeds let the Step 386/20 perform compatibly with a wide range of software. This system is one of the fastest in CPU performance we reviewed. The only area in which the Step 386/20 fell short was security: The syste lock affects the keyboard but not the case. Setup is ROM-based, but the system

comes with diagnostic software and drivers for EGA, a RAM disk, and a disk cache. Everex does not bundle DOS with A slightly higher-than-average price doesn't keep this solid system from being a good value

List price, \$7,957 (as configured). Model tested includes 20-MHz 80386 processor, one serial port, one porallel port; support for 80387 and Weitek 1167 coprocessors; 200-watt power supply; battery-powered clock/calendar; EGA board and color monitor; 80-megabyte Seagate MFM hard disk; 1.2-megabyte 5%-inch floppy drive: 4 megabytes of RAM. Everex Systems, 48504 Kato Road, Fremont, CA 94538; (800) 356-4283.

### 7.6 ATAT 6386E Workgroup Optimized for the Unix operating system this monster system (with a minimum

135-megabyte drive) supports up to 64 megabytes of RAM. In the InfoWorld benchmark tests, the 6386's CPU earned a score of very good for speed, and the big ESDI drive rated excellent and very good respectively, in sequential and rando access speed. Hardware compatibility was excellent and software compatibility was very good. We were unable to verify AT&T's claim that this system runs Microsoft's OS/2 Software Developers'

DOS, EGA drivers, and setup and diagnostic software come with the system, which is physically huge: The tower is 24 inches high by 17 inches deep by 9 inches wide. Layout and mechanical design are superior.

The 6386E WGS costs more than

three times as much as the least expensive 386-based system we tested, but its remarkable expandability (as well as its high-end performance and high-capac drive) go a long way toward justifying the List price, \$12,186 (as configured). Model tested includes 20-MHz 80386

processor, one serial port, one parallel port; 11 expansion slots (two 8-bit, five 16bit, four 32-bit); support for 80387 and Weitek 1167 coprocessors; 265-watt power supply; battery-powered clock/calen-dar; EGA board and color monitor; 135-megabyte ESDI hard disk; 1.2-megabyte 5%-inch floppy drive: 4 megabytes of RAM (expandable to 64 megabytes). AT&T, I Speedwell Ave., Morristown, NJ 07960; (800) 247-1212.

7.6 Compaq Doskpro 386/26, November 14 (also reviewed August 1). This system combines top computing and disk speed with good design and solid construction. It outper-forms almost all the other 386-based machines we tested, running almost 25 percent faster than its 20-MHz

Alas, all this power doesn't o cheap, weighing in at \$11,000 plus. That buys you superior design and high manufacturing quality, though these are offset by a lackluster warranty and spotty dealer-only technical support - the only disappointments in a system whose per ance, compatibility, and exceed ability are uniformly excellent.



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List price, \$11,717 (as configured). Model tested includes 25-MHz 80386 processor, one serial port, one parallel port; support for 80387 and Westek 3167 coprocessors; 192-watt power supply; battery-powered clock/calendar; VGA board and color monitor; 110-megabyte ESDI hard disk; 1.2-megabyte 5%-inch floppy drive; I megabyte of RAM; 32K of cache RAM. Compaq Computer Corp., 20555 FM 149. Houston. TX 77069: (713) 370-

### 200-BASED SYSTEMS

8.7 Walls American Compust December 19.

The Wells American Compr right past our definition of excellence in expandability and kept on going. With its unusual system-box design, the Compustar can be upgraded easily from an 80286 to an 80386 processor, and from an AT bus to MCA bus structure, simply by swapping boards. The system box is impressively constructed from cast alu-

n top of excellent workmanship and expandability, the Compustar offered great performance in the 20-MHz 286 model."

minum and can handle seven mass stor age devices in addition to 16 mega emory, as well as built-in VGA and ports. With the Compustar, you can as-semble custom configurations on demand from mix-and-match components, aking buying decisions much easier. On top of excellent workmanship and expandability, the Compustar off great performance in the 20-MHz 286 great performance in the 20-MIEZ 280 model we tested and good prices for the whole line. OS/2 compatibility is claimed, though not tested. This system is a speedy, innovative addition to the parade of quality systems that appeared this year, and we rate it a very good value. List Price, \$5,390 (as configured). Model tested includes 20-MHz, zero-waitstate 80286 CPU; two serial ports, one porallel port; support for 80287 coproces-sor; 220-watt power supply; batterypowered clock/calendar, VGA board and monitor: enhanced keyboard: 150-mesobyse ESDI hard disk; one 360K 5%-inch and two 1.44-megabyte 31/2-inch floppies;

7.0 Doll System 200, July 25.
Although at first indistinguishable from other medium-speed 80286-based systems, the Dell System 200 offers tanding vendor support and a very low price to make it a stand-out buy among its competitors and a good choice for graphics or word processing applications that have outgrown slower systems. It also ran Dell's version of OS/2 with no problems. All in all, a very good value. List price, \$2,999 (as configured) Model tested includes 12.5-MHz, one moderate BCZBC processor two serial ports, one parallel port, support for 80287

1 megabyse of RAM. Wells American Corp., 3243 Sunset Blvd., West Colum-

hia. SC 29169: (803) 796-7800



The Dell System 200

coprocessor; 200-watt power supply; bat-tery-powered clock/calendar; EGA board and monitor; enhanced keyboard: 40megabyte MFM hard disk, 1.2-megobyte 54-inch Stoppy drive; 640K of RAM. Dell Computer Corp., 950 Arboretum Blvd., Austin, TX 78759; (800) 426-5150.

7.6 Everex Step 266/16, July 25. The first 16-MHz 286-based sys tem we tested, the Everex Step 286/16 lived up to its promise of speed. Although its workmanship wasn't quite as solid as that of the slower Dell System 200 (a lot of cold solder on the motherboard), its performance was top-notch and its soft ware and bardware compatibility excel-

We also liked the system's front-panel eight-character LED display for status and error messages. Everex has not released its OS/2 version yet. Although not the least expensive 286 system we tested, the Everex Step 286/16 was clearly the fastest we had tested until then (since surpassed by 20-MHz systems), and we rate it a very good value.

List price, \$4,147 (as configured). Model tested includes 16-MHz, zero-waitstate 80286 processor; one serial port, two porallel ports; support for 80287 coprocessor; 200-watt power supply; battery powered clock/calendar, EGA board and monitor; enhanced keyboard: 40-megobyte MFM hard disk: 1.2-megabyte 51 inch floppy drine; I megabyte of RAM. Everex Computer Systems Division, 48504 Kato Road, Fremont, CA 94538: (800) 356, 4783

### Portable Computers

8.1 Put a 16-MHz 80386 proces and a 40-megabyte hard disk into a lapte computer, and you've got a portab system capable of putti desktop systems to shame. ne last year's

The Toshiba T5100 is an or example. It costs about \$1,000 less than



The Toshiba T5100

its nearest competitor, the Gridcase 1530; and while the Toshiba lacks the Gridcase's internal battery power, it runs almost twice as fast, has a better keyboard, and features a high-resolution EGA display. Its single expansion slot accommodates either a 1,200-bps modem or an adapter that connects to an expansion chassis which holds five fullslot PC add-in boards. Another connector lets you attach an AT-compatible keyboard of your choice.

At 15 pounds, the T5100 is no featherweight, but it is small enough to fit into a standard attache case and offers heavyweight performance.

List price, \$7,199. Model tested includes 16-MHz 80386 processor; one serial port, one porallel port, 2 megabytes of RAM; 40-megabyte hard disk; one 1.44-megabyte 3%-inch floppy drive; MS-DOS 3.20. (Windows/386 bundled with the T5100 as of July 1988.) Toshiba America Inc., Information Systems Division, 9740 Irvine Blvd., Irvine, CA 92718; (800) 433-5999

### Video Boards

8.2 Paradise VGA Plus, June 27. It's hard to choose among th ature-rich VGA boards with their high resolution and brilliant colors. One prouct that stands out is the Paradise Plus, highest rated among the VGA boards we tested in 1988.



With its proprietary chip set, the Paradise board supports all 17 VGA modes, is register-level compatible with the VGA standard, and is also compatible with EGA, CGA, and Hercules mod Like the IBM and Compaq boards, it's intended for use nnly with analog monitors. Unlike those boards, it comes with high-resolution software drivers for seven popular applications, including Autocad, Ventura Publisher, and Word Perfect. The only disadvantage of this board is its lack of any "enhanced" 25-color resolutions. Compatibility, setup, and

ease of use are excellent. The board is a very good value. List price, \$399 for the 8-bit, halflength board with 800-by-600 resolution in 16 colors. Model tested includes seven high-resolution software drivers. For the IBM PC XT, AT, and compatibles. Paradise Systems Inc., 800 E. Middlefield Road, Mountain View, C4 94043: (415)

8.1 Rasterops Colorboard 104, July 11. This 24-bit video board for the Macintosh II offers true-to-life the Macinion is outers transcribe

16.7 million simultaneous colors on the Mac II screen. Rasterops supports this palette by bundling software that extends the capabilities of Color Quickdraw and also includes a scrapbook of 24-bit color im-

Not surprisingly, the Colorboard 104 taken substantially lowers to redraw the screen than its 8-bit counterparts do. Although deciding bow to take advantage of all the available bues and resolutions can add to the time it takes to create an image, the board's capability to switch between 8-bit and 24-bit modes lets you do rough-in previews of the final picture. The list price is high, but the result is vivid, near-photographic-quality color on the Mac II

List price, \$3,495 for the 24-bit board with 1,024-by-768 resolution and 16.7 million colors. Model tested includes 2.3 megabytes of RAM. For the Marintonk II. Rasterops Corp., 10161 Bubb Road, Cupertino, CA 95014; (408) 446-4090.

### 7.7 IBM VGA Diaplay Adapter, February 22. The compatibility, setup, and case of use

of this XT-bus video board are what we expect of IBM: to wit, excellent. These features do much to offset its slower speed and limited workmanship, documenta tion, and technical support scores, which are no better than satisfactory. IBM doesn't include any software drivers with the board. Nor does the VGA Display Adapter support Hercules mode.

spite these potential drawbacks, IBM's board remains a reasonable invest ment, nffering complete VGA compati bility and outstanding performance (with especially brilliant colors in 256-color mode) at a fair price

List price, \$595 for the 8-bit, fulllength board with 15-pin connector. ware drivers included. For the IBM PC AT and compatibles. IBM Information Systems Group, 900 King St., Rye Brook, NY 10573; (800) 447-4700 (dealer

7.7 STB VGA Extra/EM, June 27. STB offers this expanded VGA board with either 256K or 512K nf RAM. (The latter is necessary for 256 colors at resolutions above 320 by 200.) The board, which runs under the Tseng Labs chip set, supports all the VGA modes and also Hercules with excellent resolution. Compatibility was also excellent: even OS/2 and Windows/386 ran trouble-free. A hardware zoom program, Hotzoom, is one of the board's catchier features.

The others include a speedup program, a mode-setting program, and a demo of all of the resolutions the VGA Extra/EM All these elements, plus its seven software drivers, four resolutions, and very good documentation, make the STB VGA Extra/EM a very good value.

List price, \$599 for the 8-bit, halfneth board with four resolutions (1.024 by 768 in 16 colors, 800 by 600 in 16 and 256 colors, 640 by 480 in 256 colors, and 720-by-348 Hercules in two colors) and 512K of RAM. Seven software drivers included. For the IBM PC AT and compatibles. STB Systems, 1651 N. Glenville Drive, Suite 210, Richardson, TX 75081: (214) 234-8750.

7.6 Sigma VOA/H, June 27.
When we tested this board, its register-level compatibility with the IBM VGA standard was offset by its lack of a software manual, high-resolution driver for Windows 2.03, and mode-switching

program. Nevertheless, the VGA/H ran well cutinns in nur test suite. including IBM OS/2 and Windows/386. Compatibility was excellent. The eight high-resolution drivers that do come with it include Lotus 1-2-3. Autocad, and Ventura Publisher. The Tseng Labs chip set on the board

supports a diagnostic program, a screen-saget sellats, a 256-color drage recurrent a speedup program, and (like the Tecmar VGA) a reboot utility for use with games. The Sigma VGA/H provides much more performance than other boards that cost just as much, making it a very good

value.

List price, \$399 for the 8-bit, half-length board with 800-by-600 and 800-by-500 resolution in 16 colors and 9- and 15-pin connectors. Six software drivers included, For the IBM PC AT and compatibles. Signa Designs, 4591 Landing Parkway, Fremont, CA 94538; (415) 770-0100.

7.6 Supermac Spectrum/S,
T.16 Suby 11.
This 8-bit color video board, which
comes bundled with Supermac's popular

Pixelpaint software (retail price \$49.5), lives up to the company's reputation for quality and solid, no-nonsense performance. Colors images are sharp and undistorted. Optional oscillators let you run the board at two resolutions in addition to its default of 1,204

tion to its default of 1,204
by 768, and the Mac II's
control panel lets you select
two, four, 16, or all 256 available colors.
Documentation is colorful and comprehensive.
The Spectrum/8 can be purchased
alone or bundled with one of four

monitors at combined prices ranging from \$3.195 to \$5.795 (the later for the board and a 19-incb Sony Trinitron monitor).

Performance, price, and ease of make this board avery good value. List price, \$1,995 for the 8-bit board with 1,024-by-768 resolution (756 by 576 and 640 by 480 alto available through optional oxillations, \$3 each) and 256

nes. colors. Model tested includes 768K of RAM. For the Macintosh II. Supermac that Technology, 486 Potrero, Sunnyvale, CA pod 94086; (408) 245-2202.

7.6 Tacmar VQA, Aure 27.
The modestly priced Tecmar VGA board offers register-level compatibility with the IBM VGA standard and

VGA board offers register-level compatibility with the IBM VGA standard and comes with eight high-resolution software drivers. Compatibility with the applications in our test suite was excellent. The Termar board supports Hercules, CGA, EGA, and VGA resolutions. Its chip set is by Tseng Labs. Unlike some of

chip set is by Tseng Labs. Unlike some of its competitors, the Tecmar VGA supports 800-by-600 and 800-by-400 resolution in 16 colors. The board comes with 2.56K of RAM and both 9- and 15-pin connectors, offering compatibility with other-thananalog monitors. Versatility, good work-

manship, and useful documentation add to the board's value, which we rate very good.

List price. \$395 for the 8-bit, half-length board with 800-by-600 resolution in 16 colors, 9- and 15-pin connectors, and 256K of RAM. Eight software drivers included. For the 18M PC AT and compatibles. Tecnus Inc. 6225 Cochan

### Road, Solon, OH 44139; (216) 349-0600. Other Boards

7.9 Orchid Ramquest Extra,

Memory expansion boards that work in IBM PC, XT, and AT systems don't run in any of the PS/2 machines, which use the new Micro Channel Architecture bus.

The Orchid Ramquest Extra is an



MCA memory board for the PS/2 Models 50, 60, and 80. It supports EMS (expanded) memory and is the only board we tested that comes with two serial ports as standard equipment. Software compati-

tested that comes with two serial ports as standard equipment. Software compatibility was rated excellent. Although oot inexpensive, the Ramquest Extra earms a good value score thanks to 51MM (single in-line memory module) RAM, very good workmanship,

EMS support, bundled software, switchless setup, and sery good support policies. List price, 5499 (sero RAM), 8349 (512K). Two serial ports. For the PS/2 Models 50, 60, and 60. Bundled noftware includes print pooler, RAM disk, disk cache, expanded memory manager. Fouyear warranty. Orchid Technology Inc., 43365 Northport Loop W., Fremout, CA 9538: (4515 683-000.

7.7 Arnet Smartport, April 4.
One relatively easy, cost-effective alternative to local area octworks is the multiuser system, which connects individual desktop systems or terminals to a central multiuser computer running one of the many Unix-derived multiuser

operating systems.

A typical 12-MHz IBM PC AT system can service up to 10 users, and a 386-based machine can handle up to 32—with the right adapter board. One of the best such boards we've seen is Armei's eight-port multisuer board, which comes with its own 80186 processor and a 64K.

RAM buffer.

Uoder the SCO Xenix operating system, you can install up to four of these 16-bit, full-size boards in your main

The Smartport is relatively expensive but highly capable. Its ports are fully configurable, and it comes with a lifetime warranty. This solid, full-featured board is a very good value. List price. \$1,295 (eight ports), \$995

(four ports). A 16-bit, full-size board with 64K of RAM and an 80186 processor. For the 1BM PC AT. Arnet Corp., 618 Grassmere Park Drive, No. 6, Nashville, TN 37211: (800) 366-8844, (615) 834-8844

### 7.6 Seattle Telecam STD-386, January 11. This 16-MHz 386 accelerator board for

the PC AT is one of the best such boards we reviewed — best oot only in terms of speed but also in memory and processing capabilities. It has room for up to 16 megabytes of high-speed 32-bit static RAM, which makes it expensive but powerful.

The STD-386 can accept both the 80387 and Weitek 1167 math coprocessor chips, and it earned boous design points for its use of SIMM panels.

The superb speed and expandability of this remarkable board come at the cost of hardware compatibility. Nevertheles, when fitted with the Weitek 1167, the STD-386 justifies its price for demanding applications such as CAD.

List price, \$1,695. Model tested includes 16-MHz 80386 processor and socket for 80387 or Weitek 1167 coprocessor back us to 16 magazine 15-ba static RAM. For the 18th PC AT. Seattle Telecom and Data Inc., 2635 152nd Ave.



S Jasmine Direct Drive 160

This solidly built 150-megabyte drive for the Macintosh comes with about 8 megabytes of public domain and shareware software, and a manual that is one of the all-time best reference works on the Macintosh SCSI (Small Computer System Interface) econection. The performance of the Direct Drive 160 is

just under \$20 per megabyte, the drive is rated a very good value. List price, \$2,899 for the 150-megabyte hard disk drive. For the Macintosh, Mac Plus, Mac SE, and Mac 11 (also for the Mac \$12E through a SCSI port adapter kijl. Jasmine Technologies Inc., \$55 De Haro SL. San Prancisco. CA.

### 94107: (415) 282-1111. 8.0 Micropolis 1375 PC Pai March 7.

excellent, and while expen-

sive, at an average cost of

Unlike any other high-capacity drive we've tested, the 1373 PC Pak, a fullheight SC3I drive and coortoller for the IBM PC, is not formatted at the factory. This convintstanding, it's remarkably easy to install, and the manual contains surprisingly clear instructions for instaling drivers for SCO Xenix and Novell

This drive earned scores of excellent for both sequential and random-access speed.

The per-megabyte cost for the drive

The per-megatoyte cost for use universal controller is about \$16.50, making the 1375 PC Pak the least expensive large-capacity PC hard disk we tested and a very good value.

List price. \$2,175 for the 145.9megabyte SCSI drive and controller. For the 1BM PC, AT, and compatibles. Micropolis Corp., 21211 Nordhoff St., Chatsworth, CA 91311; (818) 799-3300.

7.9 CMS 8D140K, March 7.
This 140-megabyte external drive for the Macintosh is a winner oo several counts. First, this 3%-inch drive weighs just under 6 pounds, compared with the 7-to 20-pound heft of other

external Macintosh drives.
It's also rated excellent in random-access speed and very good in sequential access. On the down side, it does oblige you to experiment to f

does oblige you to experiment to find the best order of connection with other SCSI devices.

At about \$14 per megabyte — the lowest per-megabyte cost of any highcapacity drive we have tested — the

capacity drive we have tested — the SD140K is an excellent value. List price, \$2.095 for the 140.3megabyte drive. For the Machaoth, Mac Plus, Mac SE, and Mac II (also for the

Mac 512E through a SCSI port adapter Mac 512E through a SCSI port adapter kitj. CMS Enhancements, 1372 Valencia Ave., Tustin, CA 92680; (714) 259-9555.

7 8 Dataframe XP180, Morch 7.
The 150-megabyte Dataframe
XP150 was tops in performance among
the high-capacity Macintosh drives we
tested, earning scores of excellent
for both random- and sequential-access speed.
Workmanship is very good:

Design details include a small cooling fan.

At about \$22.50 per menabyte, the drive isn't cheap, but its



top-noteb performance makes it a good value. List price, \$3,295 for the 150-mega byte drive. For the Macintosh, Mac Plus. Mac SE, and Mac II (also for the Mac Mac SE, and Mac II (also for the Mac 512E through a SCSI port adapter kit). Supermac Technology, 485 Potrero Ave., Sunnyvale, CA 94086; (408) 245-2202.

### 7.8 Storage Dimensione AT166, Merch 7.

146-mogabyte AT155 PC subsystem is built around a CDC Wren III disk drive and a Future Domain SCSI controller. Speedstor software sets up the hard disk and provides diagnostics for both the drive and controller, and the Speedcache disk cache program enhances both floppy and hard disk operation.

This drive was faster than any of the other PC SCSI drives we tested. The system is well-designed, with very good workmanship and technical support ust under \$20 per megabyte, the AT155 is rated a good value List price, \$2,950 for the 146-mega byte SCSI drive. For the IBM PC AT and npatibles. Storage Dimensions, 981 University Ave., Los Gatos, CA 95030; (408) 395-2688.

### 7.7 Boring Totam, March 7. The Totem drive comes in three

configurations: hard disk only, holding up to 140 megabytes; single or dual 20megabyte removable Bernoulli disk drives; or a single Bernoulli drive with a 20-, 40-, or 80-megabyte hard disk. The non-Bernoulli 140-

byte version of the megabyte version or un Totem performed very well in our benchmark tests. carning scores of very good for sequential-access speed and excellent for random-access speed.

During setup, SCSI addresses are selectable with a handy external digital switch. Our only quibble with the drive is that the bundled utilities don't provide a way to do a low-level format. Technical support was good, and the per-megabyte price of about \$19 makes the Benna Totem a very good value. List price, \$2,595 for the 140-mega-

byte drive. For the Macintosh, Mac Plus, Mac SE, and Mac II (also for the Mac 512E through a SCSI port adapter kit). Bering Industries Inc., 240 Hacienda

Ave., Campbell, CA 95008: (800) BE-RINGI, (408) 379-6900.

# 7.7 Storege Dimensiona Leserster LSGOG AT-E, Sep-tember 5. Once data have been written

on the Laserstor's write-once optical disc, it can't be erased. This permanence makes the WORM drive ideal for archiving and similar applications.

The unit's 800-megabyte capacity isn't likely to be used up overnight.

The Laserstor's reliability is excellent;

in our tests we could find no way to cause casual damage to the media. For safe, permanent data storage at a rate of about 2 megabytes per minute and a cost of about \$6 per megabyte (drive and media), the Laserstor is a very good

List price, \$4,495 for the 800-megabyte WORM (write-once read-many) optical disc drive. Requires 384K of RAM (640K recommended) and MS-DOS 3.0 or later. For the IBM PC, XT, AT, and compatibles. Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; (408) 879-0300

### 7.6 September 5.

Each removable disk cartridge in the Bernoulli Box II backup system holds 20 negabytes of data on a flexible disk. We found this to be a sturdy and durable drive, and while slower than a typical hard disk drive, it was the fastest backup device we tested, carning a score of excellent for speed in our backup technologies product comp Installation isn't difficult, but it does take time. Operating the unit requires some attention, but the built-in format, backup, and restore programs handle most of the details. Capacity is good, and reliability is excellent.

Although its cost per megabyte is the highest among the backup technologies we tested (due to frequent replacement of the media), the unit's alter ego as a removable hard disk makes it a good

List price, \$2,350 for the dual-drive external unit (40-megabyte capacity, with 20 menabytes on each scaled floory disk carridge). Requires 128K of RAM (256K recommended) and MS-DOS 2.0 or later. For the IBM PC, XT, AT, PS/2, and compatibles, Iomesa Corp., 1821 W. compatibles. Iomega Corp., 1821 W. 4000 South, Roy, UT 84067; (801) 778-

### Monitors

7.6 Sigme Laserview for the Mac The dual-page Sigma Laserview provides

one of the best high-resolution full-page monochrome screens for the Macintosh, with clear whites, solid blacks, and accurate grays in a flicker-free 19-inch

display. The tinted screen

minimizes glare, and the entire unit sits on a tilt-andswivel stand. Display quality and ease of use offset a



slightly higher-than-average price, mak-ing the Laserview a very good value. List price, \$2,295. Dual-page, 19-inch prochrome monitor for the Macintosh SE. Standard resolution, 832 by 600; high resolution, 1,664 by 1,200. Includes tinted screen and tilt-and-swivel stand. Sisma Designs, 46301 Landing Parkway, Fremons, CA 94538: (415) 770-0100.



### And Tied for 93rd Through 100th Place . . .

The following products tied, with a sec of 7.5, for a place in the InfoWorld Top

### Software

fus Freehend (Aldus Corp.) - An illustration and drawing package for the Macintosh. List price, \$495. (Review,

CC Mall (CC Mall) — An Inter-LAN E-Mail package, LAN package, \$695. (Product Comparison, November 28).

D the Dete Leeguage (Celtex Soft-ware) — A relational database for the IBM PC. List price, \$395. (Product Companson life () The Emcee (Commend Software Sys-

tems) - A menu utility for the IBM PC. List price, \$69.95. (Product Comparison, July 18).

Inbox/PC (Symentec) - E-mail soft-

ware for PC LANs. List price, \$599. (Product Comparison, February 15). Padamakar 3.0 (Aldus Corp) - A desktop publishing package for the IBM PC. List price, \$795 (also available for

Macintosh). (Product Comparison, De-Peachtree Complete II (Peachtree

Software) — An accounting package for the IBM PC. List price, \$195, (Review. July 4).

Publisher's Paintbreak (Zsoft) — A paint package for the IBM PC. List price, \$285. (Product Comparison, December

Reference Fits (Reference Software) - A pop-up database, List price, \$89 (Review, August 8). **Surpass** (Surpass Software Systems)

An integrated spreadsheet for the IBM PC, List price, \$495, (Review,

Viewpoint (Computer Aided Menagement) — A project management pack-ege for the IBM PC. List price, \$1,995

### Review, November 21) Hardware

ALR Flexcache 20386 (Ad) Logic Research) — A 20-MHz 80386 system. List price, \$9,763. (Product Comparison, May 2; also see Review,

AMT 386 6T (American Micro Technology) — A 20-MHz 386 system. List price, \$6,200. (Product Comparison, May 2).

Arche Rivel 366 (Arche Technologies) - A 20-MHz 80386-based system. List price, \$5,590. (Review, August 22).

Colorecript 100 (OMS) - A col Postscript ponter. List price, \$24,995. (Review, July 25). Compag 386/20e (Compag Computer Corp.) — A 20-MHz 386-system. List pnce, \$7,418. (Review, October 31).

Compaq Deskpre 366 (Compaq Computer Corp.) — A 20-MHz 386 system. List price, \$10,896. (Product

Laser Digital Pacar 3866/24 (Le-ser Digital Inc.) — A 20-MHz 386 system. List price, \$5,890. (Product Comperison, Mey 2)

Micra 1 Power 386 (Micro 1 Inc.) — A 20-MHz 386 system. List price, \$6.145, (Product Companson, Mey 2).

PC Elevator 386 (Applied Reason - An accelerator board for the IBM PC XT or AT, List price, \$1,995, (Product Companson, January 11).

Recal Vedic Maxwell 2400 VP (Racel Vedic Inc.) — A 2,400-bps modern. List price, \$595. (Product Comparison, December 19).

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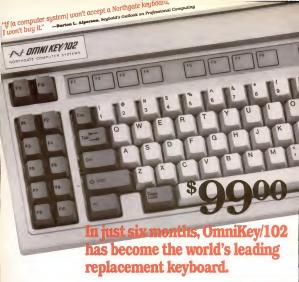
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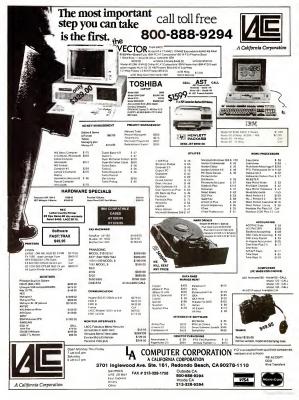
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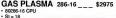
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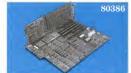
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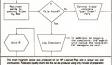
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### OSF

### Continued From Page 1

ence. If we cannot come to terms with the first alternative on the list, then we will move on to the next alternative. Paul said there were three lternatives on the list, and the final specification could based entirely on one of the submitted products or be a bybrid of several products. He also confirmed that some or all of DEC's XUI offering and the HP/Microsoft development of a Common X Interface (CXI) and Presentation Manager over X Window (PM/X) were among

the final contenders. "Business terms will determine the final outcome," be said. Sources close to OSF indicated that two favorites are the HP/ Microsoft offering and a bybrid of DEC Windows and HP/Mi-crosoft. The hybrid would be likely to consist of the Presentation Manager look of PM/X, the 3-D capabilities of HP's CXI. and DEC's XUI toolkit, which contains the applications pro-grammers interface (API).

Although some have o ned the speed of PM/X, Paul said its performance bus been enhanced by the use of sadgets.

## 111111 Married Street D 100 OSF's UEC: DEC's big hope at OSF is its XUI toolkit, while its graphical interface (above) seems destined for second place.

ramming modules similar to those in DEC's XIII

As of the end of last month. DEC was keeping a stiff upper lin publicly, maintaining that it was bopeful for the adoption of the entire DEC Windows XIII package. The bopes focused upon the adoption of the XIII toolkit. "The key is the tools not the look and feel," said DEC's Jim Burclay, manager of rate toffware entit DEC spokesman Chuck Mal-kiel went further, saving, "We

- said last February to expect a 386 version of IBM's low-end

PS/2 Model 30 by the end of

1989. Lowe's promise to have a 286 version of the Model 30 by

the end of 1988 was delivered in

September. That machine, like

the upcoming SX system, has what IBM calls the "Family II"

bus, which is compatible with

IBM can offer a low-end 386

machine at a similar price point

in 1989 - something Lowe

would belp Big Blue protect its

roding market share. (See "IBM Details Aggressive Pricing

Although it is always difficult to second guess, IBM illustrated

in 1988 even more dramatically

bow it can cancel or postpone

product introductions with rela

For example, a portable ver sion of the 386-based Model 70

which was originally scheduled

to be announced in September,

was pushed back to October,

tively short notice

specifically promised

Plans," February 22, 1988.

Analysts and users say that if

the AT bus.

are confident that OSF will select at least some element of XIII but we have committed to implement whatever they so, lect." Malkiel said the PM/X look and feel would be "relatively trivial" to put into DEC Windows The part that we are the

most concerned about is the applications programmers inter-face," Malkiel said, "Rewriting DFC Windows to a differe API and toolkit would be a much more difficult task."

then January, and now to some unspecified future time, according to sources close to IBM. rces say it was decided that any IBM portable would have to be run on a battery.

And, according to what Lowe said in an InfoWorld interview last fall, the planned portable Model 70 was a high-function machine requiring a portable power supply. This will mean some significant design changes before the machine can be

brought to market. In 1989 also expect IBM to identify some of the so-called "reserved lines" in the MCA. IBM's chief architect of the MCA, Chet Heath, said at fall Comdex that information will

forthcoming on some of MCA's yet-unidentified capabilities. He also emphasized that any enhancements IBM makes to the MCA will be backward compatible Although 1989 will also ush

er in OS/2 and Presentation Manager applications, it is unlikely that most corpora will make the shift from DOS to OS/2 until 1990 and beyond. Bob Carberry, IBM's vice predent of systems engineering, said an InfoWorld interview last month that loftier expectations of OS/2 acceptance would have been premature. On the bus architecture

front, it appears as though IBM's MCA is finally catching on, according to the Sierra Group, in Tempe, Arizona. "We see IBM regaining acnt control in 1989, unlike in Vendors Join Netware.

**LAN Manager Servers** electronic mail, and multiuser

With Novell's Netware and Microsoft's OS/2 LAN Manager struggling for dominance in the PC networking software market. some smaller players see a niche for LANs that offer both Netware and LAN Manager servers. Torus Systems Inc. of Redwood City, California, recently began shipping a \$295 Netware Integration Option, which makes servers running Netware 2 fla or 2 lx accessible to work. stations running Torus' Tapestry II LAN Manager.

But the product also brings

LAN Manager to Netware, according to Torus technical support manager Ken Stanley The heart of our product is Tapestry II, a distributed operating system that runs on the workstations," Stanley said. "We can assign any drive on the network as a shared resource whether it is a LAN Mana server, a Netware server, or a DOS hard disk on the workstation down the hall. So Tapestry II can work equally well for Netware users accessing LAN Manager servers and for LAN Manager users accessing Net-

With Tapestry II LAN Man

Announced in October for March delivery, LMN Server was criticized by Novell for not working in both directions. Sure enough, Interlan now has a follow-on product in develop-ment to allow LAN Manager clients to access Netware serv-"We wanted a gateway to allow Netware clients to reach our Interian LAN Manager serv-er," said Richard Henkus, prod-

time management, the product is attractive but expensive for

Netware shops to implement, costing \$2,995 for an eight-station starter pack, including

OS/2 and LAN Manager. The \$295 Netware Integration Op-

tion works only with Tanestry

grating Networe and I AN Man-

ager is LMN Server, an \$850

product from Interian Inc. of

Boxhorough, Massachusetts,

which allows Netware clients to

access LAN Manager servers.

Another approach to inte

uct manager for Interlan's Novell products, "Then Novell asked us to do a gateway going the other direction. The com plete suite will be bidirectional and available in June or July."

### Dhase

Continued From Page 1

dard SQL syntax, which Ash ton-Tate claims to support entirely. Two tests included subqueries with "exists" and "not exists" predicates. The Quad base test database of 175 clients and 6,300 transactions is much larger than the database used by shton-Tate to demonstrate SQL processing in Dbase IV Three "anomalies" cause the inaccurate results, said Joe

Budge, database husiness unit product manager. One of the hugs causes prob lems when the data file contains data that are 95 to 100 percen in a natural sequential order (as

if they were entered in the order they were indexed on), they were indexed on), the Ashton-Tate officials said. The Dbase SQL optimizer may assume the data are already entire ly in that order and overlook some of the correct data The second anomaly appear

when a subquery bas an "exists" or "not exists" condition and the subquery file has more than 5,000 records, officials said. The program then produces an "inl error" messas A third anomaly was re

aled by a test developed by SQL consultant Richard Finkel stein. A Dhase SQL query attempting to join two tables with a local predicate on the same column as the join column resulted in an internal error. Ashton-Tate said the anomaly appeared when both tables were

The work-arounds being de veloped include procedures for reindexing certain files and special word al wording for some queries.
"We will widely disseminate

these work-arounds to any Dhase IV user, on Compuserve and elsewhere, and we will alert the media," said Ashton-Tate spokesman Knox Richard But the essence of SQL is that, like English, there should be various ways to ask the same question, and Ashton-Tate must eliminate the anomalies to complete its SQL implementation, or Dbase SQL will be unreliable and unusable, Finkelstein said

"The method that they're ng to translate the SQL into Dbase is clearly unstable," Finkelstein said. "They're trying to do it by brute force, and the brute force method is always liable to errors Dbase SQL will need only

minor changes as a result of the known anomalies, Ashton-Tate "It's very clean code, and only under the specific conditions that we've described do these errors occur," Richardson Experts believe that Dbas

IV 1.1, running against the SQL engine in SQL Server, will not contain the problems inherent in Dbase IV 1.0. Ashton-Tate's Richardson also said the stand alone Dbase IV 1.1 will not contain the problems that cause the error

### IBM

Continued From Page 1 Indeed, IBM last month took

it two facing full-page ads in The New York Times to try vide a nontechnical analo gy of the MCA's capabilities, owing that the "classic" AT bus was to the MCA what a single column of print from The Wall Street Journal was to the entire publication

As far as 1989 new product announcements, IBM is expect-ed to release its 386SX machine ometime during the first half of 1989. IBM senior executives have called the SX chip an important and interesting technology, declaring that a ma version of Intel's 386 chip would fit into a market niche between high-end 286 machines and low end 386 machines

Former Entry Systems Division president William Lowe now a senior executive at Xerox

### Windows Continued From Page 1

Windows, saying only it is "committed to moving the product forward. We have lots of good plans for Windows." Cleaning up Windows' mem y managment will also dra-atically boost its speed. "The place where Windows slows down is not in the vector aws or in moving windows, it is in the way it constantly

ows away and reloads code.

A fundamental existing design flaw that a new version might correct is Windows' inability to move data segments within applications. Even bank switching does

n't do much good because you still have these lockable segments that bog you down," a source said. "You spend all your time discarding something and then turning around and rek ing the same piece of code to execute the same instructions."

— Stuart J. Johnston also contributed to this story

1988, when it bad a lot of gers," said Marty Gruhn, Sierra roup vice president.



989 came rolling into San Francisco on a bank of fog, its misty numbness exactly mirroring the neurological vacuum in my mind. Too many drinks, too many cigars, too many news tips had passed through me at parties the night before, and in the thousand nights before that. The walls did their Armenian folk dance as I struggled out of bed for a piece of paper on which to write my New Year's resolutions.

BLUE LIGHT SPECIAL. There are three classes of resolutions (frankly, there are three classes of everything). Class one includes resolutions that nobody could ever keep, like "lose 50 pounds, stop drinking, stop smoking, enter a Buddhist monastery." Class two is the targeted resolution, which emphasizes a single variable, like "lose 25 pounds, drink less, smoke less, learn about meditation Class three resolutions are the real ones,

IBM Resolves: Lose Weight, Port PM, Cut Prices IBM appears to have made a real resolution to lower prices by increasing discounts to dealers and large corporate clients. Currently, "C" dealers get the best discounts on PS/2s: 38 to 42 percent off retail. "B" dealers get 32 to 35 percent off. Look soon for "D" discounts of over 45 percent on large orders of MCA machines. The reason behind the resolution is that MCA sales are finally picking up and IBM wants that to continue in the

> OON, PM ON PRO-DOS! Most of my resolutions involve things I'm going to stop doing. This year it is "stop drinking. Last year it was "stop smuggling emeralds out of Thailand" (I kept that resolution). Microsoft would be wise to stop giving in to Big Blue. Redmond has apparently contracted to port Presentation Manager to DOS so that developers would have one interface to write to and users only one user interface. The hitch is that it takes way too much memory. Additionally, developers with existing Windows applications would have to totally rewrite them, just when Windows is finally

face of EISA.

taking off. BEWARE THE WRATH OF RAY. Money and taxes (anti-money) have played hig roles in my past resolutions, with pledges to save, spend, pay, and avoid coming on alternate years. I have never resolved to buy a software company, though. Computer Associates apparently has, since they are seriously thinking of huying Micropro for around \$40 million.

The hitch is Micropro's refusal to lemnify CA in the event that the litigious Millards prevail in a copyright infringement suit. William Millard, late of infringement and, now of Saipan, has sued Computerland, now of Saipan, has sued Seymour Rubinstein and other former Micropro officials for stealing the code from an IMSAI product to create Wordstar. This is more than look and feel. Millard says that the programmer stole the code directly. "Good artists copy, great artists steal," Steve Jobs once said, "Good artists copy, copying a line from Picasso

Also for sale is Borland, which has apparently given up its plans to go public in the United States, and has lined up investment bankers for a huy-out. If you have to ask, you can't afford it.

SPARCS FLY. Forty minutes of labor produced half a page of illegible scratchings vaguely like the Rosetta stone. "What is this, a prescription?" asked Pammy who had invaded my space, slamming the front door and setting off thermonuclear devices in my head. In a similar display of youthful power, the second week of January will be RISC workstation introduction time, with Solbourne introducing its heavyweight 64-hit parallel-processing SPARC-based computer on January 9. Sun has a SPARC announcement (or is it 68030) the same day, while DEC introduces the MIPS-based Personal VAX, or PVAX on the 14th. Accepting reality, HP will cut prices on its HP 9000 workstation at about the same time.

"Want some cold pizza?" asked Pammy as I ran past her for the bathroom.

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